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The Development of a Partnering Assessment Tool for Projects

Armin Holkers[1], *Hans Voordijk*[1] *and David Greenwood*[2]

ABSTRACT

Many firms in the construction industry claim to be working in a 'partnering' or even in an 'integrated' way. It is, however, very difficult to verify these claims with the tools currently available. The purpose of this study was to collect and refine existing work on integrative and collaborative working, so as to develop a quick and simple tool that measures the degree of integration with which firms are working. First, the concepts of 'Partnering' and 'Integrated Working' are discussed and, for the purposes of the work a major supposition is adopted: that the difference between these concepts is that companies that are partnering only share project-related information, while companies working in an integrated way share much more of their available information, knowledge and experience. Secondly, the development of the Partnering Assessment Tool is explained and its application to four cases is recounted. The companies' overall scores are presented and discussed as to whether these scores might reflect their actual levels of integration and cooperative working. These scores are presented on a scale that contains the categories 'Cooperative Working', 'Partnering' and 'Integrated Working'. It is concluded that the application of the tool can provide a useful insight in the nature of the relationships between companies that work together in construction projects. Finally, it is recommended that the tool be tested in more cases and companies, and in a variety of different contractual contexts.

Keywords: Assessment tool, Co-operative working, Integrated working, Partnering.

1 *Department of Construction Management and Engineering, University of Twente, P.O. Box 217, 7500 AE , the Netherlands School of Built Environment*

2 *School of Built Environment, Northumbria University , Newcastle-upon-Tyne NE1 8ST, United Kingdom E-mail: david.greenwood@northumbria.ac.uk*

1.0 INTRODUCTION

The concept of 'partnering' has become a mantra for companies in the UK construction industry, and many claim to have embraced 'partnering' or 'integrated working' on their projects. However, it is particularly difficult to verify these claims and assess whether a company is really partnering, or not: some may not actually be trying (and merely paying lip-service to the idea); others may be trying unsuccessfully; and some companies may actually be successful. The objective of this study is to develop and test a simple tool; the *Partnering Assessment Tool*. We first describe the nature of buyer-supplier relationships in the construction industry, and in particular, the traditional approach to these relations. Following this, the paper focuses on the definition and benefits of buyer-supplier relationships based on partnering and cooperative working, and examines the differences between these concepts. This is followed by a description of the development of the Partnering Assessment Tool, consisting of defining relevant criteria and constructing a scale with categories of cooperative working. This tool is then applied to four test cases, whose results are presented, for the purposes of demonstration and internal validation. The final section presents conclusions and suggestions as to why the tool can offer a hitherto unavailable insight into aspects of integration within the entire project supply chain.

2.0 BUYER-SUPPLIER RELATIONSHIPS IN CONSTRUCTION

In the last twenty to thirty years there has been an apparent move away from arm's-length relationships towards longer-term collaborative working (see, for example, studies by Bensaou, 1999; Sako, 1992). Indeed, many industrial markets are now characterized by the existence of longer-term buyer-supplier relationships (Håkansson and Persson, 2004). Several constructs and frameworks have been developed which have contributed significantly to our understanding of how different buyer-supplier relationships can be developed and managed. For example, Bensaou (1999) presented a portfolio model, and Axelrod (1984, 1997) studied evolutionary patterns of collaboration between multiple agents from an 'organisational ecology' perspective. Cox and Thompson (1997) have argued that models that have been developed from manufacturing industries (such as automotive and electronics) where production takes place within controlled factory environments and where the supply of goods is merely a repeat process of a production line, are of limited use in the construction industry, where most work is organized as projects. The normal systems of tender-based procurement, as well as the 'project-organization' of most work within this industry naturally leads to arms-length relationships, even if the firms repeatedly encounter their counterparts in various construction projects over time.

In the traditional building process, the construction firm obtains a project by tendering. The client chooses the contractor who has offered the best price. Because of the cost-driven nature of the building industry, the successful contractor, in turn, looks for the most competitive prices from its suppliers and subcontractors. The contractor then executes the design, assisted by suppliers and subcontractors. This temporary coalition lasts only until the completion of the project. During the execution stage of the building process, each firm involved allocates resources according to its contract (Voordijk, 2004). These professional and organisational boundaries are rarely crossed. The temporary character of relations stimulates opportunistic behaviour whereby parties may try to obtain as much as possible from their contract (Williamson, 1985). Buyer-supplier relationships in such a traditional construction setting can be characterized as a typical market-exchange relationship, where, according to Bensaou, 'information exchange between two firms takes place mainly during bidding and contract negotiations. Suppliers do not get involved in the design of the component and usually manufacture to the buyer's specifications' (1999, p. 41). It has been argued (for example, by Dubois and Gadde, 2000) that this lack of continuous relationships between firms is the main reason for the construction industry's failure to increase in efficiency and innovation. Although this industry is 'ahead of most other industries in terms of outsourcing' (Dubois and Gadde, 2000, p. 207) many commentators have expressed a dissatisfaction with the

temporality of buyer-supplier relationships; compared to the prime movers in other industries (e.g. automotive), construction contractors do not take full advantage of opportunities to make use of external resources through buyer-supplier cooperation (Lamming, 1993). Most construction firms continue to approach building projects as one-off efforts. This leads to difficulties in accumulating and disseminating corporate learning among projects: the project-based, customized design and execution process fails to capture the benefits of standardized work processes and the integration of automation. Opportunities to capitalize on economies of scale are lost on individual projects. The various buyer-supplier strategies available to manage suppliers are well known in manufacturing. Their applicability in the construction industry however is still less well understood (Barlow and Ozaki, 2005 and 2003; Barlow et al, 2003). For certain products and services in construction, arms-length transactions could be replaced by relationships based on partnering and integrated working; approaches that stimulate adaptation and joint development between buyers and suppliers (Dubois and Gadde, 2001; Storer et al., 2003).

3.0 A RANGE OF FORMS OF COLLABORATIVE WORKING

3.1 Partnering

Although terms such as 'Partnering' and 'Integrated Working' are often used interchangeably, there are arguably differences between the concepts, with 'Integrated Working' being considered a more advanced form of Partnering. Many definitions have been formulated. As Critchlow (1998) observed,

> it can be seen that there is no unified concept of partnering. Rather, it is an umbrella term for a multiplicity of relationships, distinguished by certain common aims, but varying immensely in the form they take.

Egan (1998) defined partnering as

> two or more organizations working together to improve performance through agreeing mutual objectives, devising a way for resolving any disputes and committing themselves to continuous improvement, measuring progress and sharing gains.

Loraine and Williams (2000) claimed to have developed a commonly accepted definition for Partnering, as

> …a relationship between purchasers and providers of goods and services throughout the supply chain. The relationship is designed to achieve specific business objectives by maximising the effectiveness of each participant's resources. The relationship is based on mutual objectives, an agreed method of problem resolution and an active search for continuous measurable improvements.

Croft (2004) formulated another definition of Partnering as

> …a contractual arrangement between two parties for either a specific length of time or for an indefinite period. The parties agree to work together, in relationships of trust, to achieve specific primary objectives by maximising the effectiveness of each participant's resources and expertises.

In a report to the Department of Trade and Industry that followed the strategic partnering initiative of The North Tyneside Partnering Agreement (Greenwood, 2004) a number of these definitions were considered. From these, a number of elements were isolated, and these were used in the present study. They are:

- Two or more organizations working, co-operatively together, to achieve mutually agreed objectives in a cost effective manner;
- A focus on continued improvement, quality and effective conflict resolution;
- The above elements underpinned by an attitude of goodwill, commitment, trust and fairness.

The 'Partnering Assessment tool' described in this paper, was developed against this understanding of partnering. As already noted, partnering does not equate to any particular or specific organizational

format. Broome (2002), for example, states that the 'Strategic Alliance' is at one extreme on the partnering spectrum. To understand what this spectrum might be, we can turn to the work of Macbeth and Ferguson (1994), who developed such a spectrum of possible organizational forms (Figure 1).

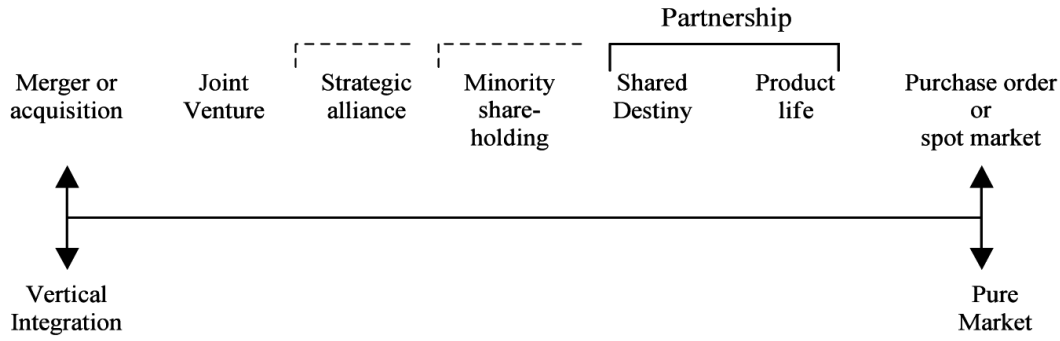

Fig.1.0 Spectrum of the possible organizational forms (Macbeth and Ferguson, 1994).

Benefits

Many potential benefits of partnering are described in the literature, the most frequent of which are:

- Reduced costs;
- Better predictability of cost, time and quality;
- Projects are finished within time and budget;
- Better-integrated design and higher quality;
- Continuous improvement and increased innovation;
- Better relationships and less confrontation (reduced level of conflict);
- Improved profitability;
- Win-win attitudes;
- Continuity of work within and between teams.

3.2 Integrated Working

When we consider 'Integrated Working' and its differences and similarities with 'Partnering', a major issue appears to be the amount of *shared information* between the parties. Organisations that work *traditionally* tend to guard their information jealously, as they work in a competitive environment; whereas those that can be said to be working in an *integrated way* adopt an open-book approach to information. Those that 'partner' on a *project-basis* share *some* information, inasmuch as it relates to the project. Thus we propose that the extent of *information-sharing* between parties can be adopted as a reasonable proxy for their *level of integration*, and used as a way of distinguishing 'Integrated Working' from 'Partnering'. This leads to the definition of 'Integrated Working' used in this present study, which is:

> Where parties have made long-term agreements to cooperate over several projects, in which they have mutual objectives, are prepared to share all relevant information, and have increased communications to multiple (rather than hierarchical) levels.

With these characteristics it is possible to develop a conceptual framework with two dimensions that also distinguishes 'Partnering' from 'Integrated Working'.

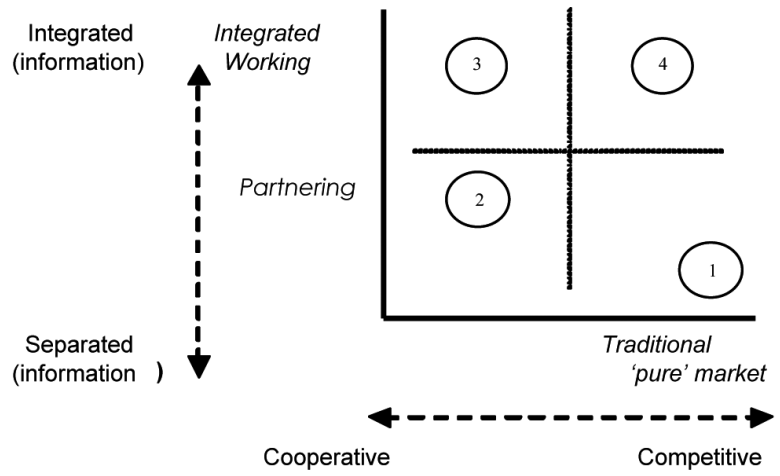

Fig.2. 0 A two-dimensional matrix

From Figure 2 four different ways of working can be theoretically distinguished:

1. Traditional, competitive working. The main objective is self-profit, there is a reluctance to share information, knowledge and experience.
2. Project partnering. The context is cooperative, with mutual goals, and a readiness to share project-related information, knowledge and experience.
3. Integrated working. The context is cooperative, with mutual goals, but extends over several projects. There is a commitment to high levels of communication, including the sharing all relevant information, knowledge and experience.
4. Integrated-yet-competitive. It is not clear whether this is a realistic category. However, the situation is possible with research companies who share their knowledge via the Internet.

Regarding the relative levels of benefit that arise from these different circumstances, it could be suggested that those of 'Integrated Working' are substantially the same as those of 'Partnering', but that they are more likely to accrue and might be greater.

4.0 DEVELOPING A PARTNERING ASSESSMENT TOOL

The purpose of this tool is to enable a quick assessment of levels of integrated working. A number of attempts to do this have been made, including work by Macbeth and Ferguson (1994), Sako (1992), Fontenot and Wilson (1997), Kozak and Cohen (1997) and Bennett (1998). This, and similar literature, provided a source that the current study has drawn upon.

4.1 Indicators

From the literature mentioned earlier, indicators were collected and assessed for suitability; the main criteria were a) the ability to quantify the degree of cooperative working and b) the connection with the characteristics of 'partnering'. This process has resulted in a list of seven main indicators. Each indicator is described in more detail below in terms of its *purpose* and *elements* (see Tables 1 and 2). The *elements* consist of short sentences to which a score can be assigned. Because the focus of this work is on dyadic (buyer-supplier) relationships, both parties were considered.

Table 1.0, Indicators focused on the general background of the buyer-supplier relationship

1. Existing relationships

Description	This indicator looks at established relations. Have there been partnerships before and what were the benefits? Are there any partnerships at present? Does the company deal with the same partners to deliver their projects?
Purpose	To establish past and present ways of working.
Elements	a) Our operational partnership arrangements are simple, time-limited and task-oriented; b) There have been substantial (past) achievements within the partnership(s); c) We always work with the same suppliers / customers and maintain an ongoing dialogue with all of them; d) There are many alternative suppliers / customers that have the same value to my company; e) In comparison to other suppliers /customers, our relationship with a certain supplier / customer is better.

2. Basis of these relationships

Description	This indicator outlines some basic ground rules of the partnership(s). Important aspects are the degree to which companies trust each other and are committed to each other.
Purpose	To provide insight in the degree of commitment, trust and fairness.
Elements	a) We feel this supplier /customer is looking out for our interests and we have belief in one another; b) Long-term commitment is both desired and the reality; c) The way the partnership is structured appropriately recognises each partner's contribution; d) Benefits derived from the partnership are fairly distributed among all partners; e) The partnership is focused on an effective conflict resolution to prevent problems becoming disputes

3. Relationships in practice

Description	This indicator questions how the involved companies carry out their relationships concerning issues like partner selection and joint programs or strategies.
Purpose	Insight into the on-site activities and possible differences between the ideas of the management and the ideas / activities on the project.
Elements	a) We select the most appropriate supplier / customer to provide the services required; b) Suppliers / customers are actively encouraged to bring forward supply chain partners, which will add the most value to successful delivery, particularly those with established proven relationships; c) We cooperate on a high level as reflected by joint marketing programs, customer strategy, sales-force activities, promotional programs, joint cost-reduce activities and joint planning; d) The partnership is focused on continuous improvement; e) Transactions with this supplier / customer do not have to be supervised closely and over half of production is not inspected.

These first three indicators were related to the general background of the companies' relationship. The remaining four indicators are interdependence, communication, information, and objectives, and are shown in Table 2 (below).

Table 2.0, Indicators focused on the characteristics of partnering

4. Interdependence

Description	This indicator questions whether companies acknowledge areas of business in which they are (or are not) dependent upon others and whether clear lines of accountability for partnership performance do exist. Without such an understanding there is a danger of partners overstepping the limits of agreed areas of partnership working.
Purpose	To demonstrate the companies' dependence.
Elements	a) We feel dependent on this supplier / customer; b) The supplier / customer is strategically important to my company; c) It would be difficult for our firm to replace the sales and profits generated by this company and it would be difficult for this supplier / customer to replace the sales and profits generated by our company; d) There is mutual understanding of those areas of activity where partners can achieve goals by working independently of each other; e) There are clear lines of accountability for the performance of the partnership as a whole.

5. Communication

Description	This indicator is one of the cornerstones of partnering.
Purpose	To provide insight in what degree communication between the partnering companies is achieved.
Elements	a) Our information flow contains a 2-way direction, multiple paths, and interchange of personnel and is often extending beyond strict business; b) Our telephone communication frequency is: (twice per month) - (weekly) - (twice per week) - (daily) – (more often); c) Our electronic communication frequency is: (rarely) - (monthly) - (twice per month) - (weekly) - (more often); d) Our partnership makes use of electronic data interchange; e) Visits to suppliers' manufacturing facilities or visits by supplier to our company regularly take place.

6. Information

Description	This indicator shows the degree in which information is shared.
Purpose	To provide insight in the levels of trust and 'open book' working between the partnering organizations.
Elements	a) We have access to suppliers' / customers' computer files and the supplier / customer has access to our computer files; b) Our company exchanges more information now with this supplier / customer than we did before the partnership was developed;

	c) We have full confidence in the accuracy of the information provided to us from our supplier / customer and we are convinced that our supplier / customer respects the confidentiality of information received from us; d) Our supplier / customer does not withhold important information from us; e) We heavily rely on oral agreements and tacit understanding.

7. Objectives

Description	This indicator questions whether the involved companies have mutual objectives and clear joint aims. It also looks upon what range of success criteria the companies are using and whether they agree about it.
Purpose	To provide insight in the existence and level of mutual goals and agreed success criteria.
Elements	a) We understand each other's business needs and goals; b) We have clearly defined joint aims and objectives; c) Our aims and objectives are mutually beneficial and create more value than if we work in isolation; d) Our aims and objectives are realistic; e) We have clear success criteria in terms of both service goals and the partnership itself.

Table 3, below demonstrates the way in which these 7 indicators and 35 elements (shown in the right-hand column of the table below, and referenced to Tables 1 and 2) are related to the 'key aspects' of partnering (shown in the left-hand column of the table below) that were adopted from the earlier work of Greenwood (2004).

Table 3.0, Coverage of indicator elements against key aspects of partnering

Key aspects of partnering	***Related indicators elements***
Two or more organizations	1a, 1b, 1c, 1d, 1e
Working together	3c, 5a, 5d, 7c
Mutually agreed objectives	4e, 7a, 7b, 7c, 7d, 7e
Cost effective manner	7c
Focus on continued improvement	3d
Focus on quality	3a, 5b
Focus on effective conflict resolution	2e, 5b
Attitude of goodwill	5a, 5b, 5c, 5d, 5e, 6e
Attitude of commitment	2b, 4a, 4b, 4c, 4d, 4e, 6b, 6e
Attitude of trust	2a, 3b, 3e, 5a, 5b, 5c, 5d, 5e, 6a, 6c, 6d
Attitude of fairness	2c, 2d

All the *key aspects* of partnering are covered by one or more of the indicator elements, but it is noticeable that some are described by more elements than others. The reason is perhaps that these aspects are more suitable for distinguishing the several forms of cooperative working, whilst others are just indicators to demonstrate the existence of relations.

5.0 METHOD

The aim of the study was to carry out a simple demonstration of the Assessment Tool in order to review its workability in the field.

5.1 Data collection

To accomplish this, the 35 elements of Tables 1 and 2 were presented in a score form (see an example extract in Table 4) with the scores being assigned a number from 1 to 5 (1 = strongly disagree, 5 = strongly agree) which can be added up. Thus the range for each indicator is between 5 and 25 points, and the range for the overall score for all 7 indicators is between 35 and 175 points. Assuming, for example, that companies answer all the statements with 'neither disagree nor agree', the amount of points (average score) will be 7 x 3 x 5 = 105 points.

Table 4.0, Example score form

To what extend do you agree with each of the following 5 statements in respect of the Partnership?	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree	*Totals*
1) Indicator X						
a) Statement Y				X		
b) Statement Z					X	
Totals	0	0	0	4	5	9

When a company has completed the form, the total scores are calculated, and these reflect the degree of cooperative working. When applied to single organisation, the result would reflect its perception of how cooperatively it works, or perhaps its readiness to work in this way. The manipulation of the results from two organisations working together, would give a truer indication of *actual* levels of cooperation. Furthermore, two or three different employees in different roles could be used, as they may have differing responses: for example, people on site may differ in their views from those at head-office. At this stage however, the investigation was restricted to a vary simple 'dry run' of the method.

Four assessments were completed on companies working on different construction projects that were underway in the Northeast of England. These were selected according to their accessibility and willingness to cooperate. Representatives from each company were first interviewed, to get an overview of the way the company preferred to work. The each was asked to complete an assessment.

Assessment 1

Company A is a wholesaler, specializing in the distribution and export of their full product line. The company's distinctive characteristic is that they consider relationships with each of their suppliers on equal grounds; no one supplier is treated differently from the rest, they are partners with all of their suppliers, except financially. They have regular communication with their partners but do not use any IT or electronic data interchange.

Assessment 2

Company B has several large supply chains. Each supply chain exists of companies who are aware of each other. Furthermore, all the involved companies have commitment to each other and these relationships are built on long-term agreements. In the last few years the company often worked with the same partners, which has encouraged interdependence. They have always selected the most appropriate partner, but do not have any shared marketing or sales force activities. The companies involved do not share a lot of information, do not have a high communication frequency and do not use electronic data interchange. This company obviously works in a cooperative way and because of its long-term commitment and mutual dependence concerning involved companies. But they are very careful with sharing information and they do not have a lot of telephone or electronic communication.

Assessment 3

Company C has relationships with some of its suppliers, but does not always work together with the same companies. It has developed mutual objectives with the companies involved, although it does not always appear to select the most appropriate supplier. Some long-term agreements do exist, but sharing information or regular communication does not take place. This company works in a cooperative way, because of the existence of some long-term relationships.

Assessment 4

Company D has long-term agreements with all of its suppliers and customers by developing mutual strategic objectives. It only selects appropriate partners, and the selection process is based on mutual trust. Communication between the partners takes place with high frequency and they share almost all their information.

The results of the four assessments are given in the following section. It should be stressed that the study was exploratory, and intended to test the *internal* validity of the approach, rather than to make any generalizable inference from these limited findings.

6.0 RESULTS

The numerical results obtained from the four partnering assessments are shown in Table 5, below.

Table 5.0, Assessment results

	Indicator	***Total scores of each firm for each indicator***			
		A	*B*	*C*	*D*
1	*Existing relationships*	18	24	18	24
2	*Basis of these relationships*	20	24	17	24
3	*Relationships in practice*	19	18	14	25
4	*Interdependence*	19	21	15	24
5	*Communication*	13	15	11	25
6	*Information*	20	17	15	23
7	*Objectives*	20	21	18	24
	Total scores on all indicators	**129**	**140**	**108**	**169**

Company A clearly appears to work within the accepted definition of 'partnering', but not in a fully integrated way in terms of sharing information. Company A received a score of 129 points. Company B received a higher score of 140 points, though performed less well on indicators 3, 5 and 6 (the last two relating to *Communication* and *Information*). Company C did have some long-term agreements, but is certainly towards the lower end of the spectrum of cooperative working, with a score of 108 points. Company D, by contrast, outperformed the others with a score of 169 points. The main reasons for this were the amount of shared information and the high frequency of communication and electronic data interchange.

6.1 Degrees of cooperative working on a scale

The total scores obtained in each case reflect the degree of cooperative working. Combined with the nature of the participants it is possible to hypothesise a scale that contains the relevant categories of cooperative working and their boundaries.

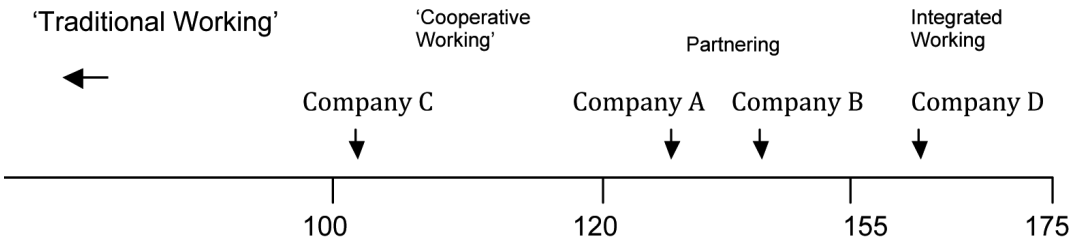

Fig. 3.0 The scale of cooperative working

7.0 DISCUSSION AND CONCLUSIONS

In the construction industry there are a number of expressions used for the general concept of cooperative working: these include 'partnering' and 'integrated working'. It is suggested that a key difference is that integrated working involves the sharing of a significant amount of information, knowledge and experience, and doing this in the longer-term (as opposed to sharing only project-related information). A *partnering assessment tool* was developed in order to measure, quickly and simply, the level of cooperative working that a firm displays. A company's overall score explains its readiness for cooperative working, which can be presented on a scale. The exact graduations on the scale have not been paid a great deal of attention here and would require further research. Furthermore the tool was only applied to the four firms described in this study, purely as a means of testing its feasibility at this very basic level. If the tool were applied to a number of pairs of companies under contract to each other, it could be used to evaluate the degree of cooperative working *between them*. This is an obvious extension of the tool, as it involves measuring both parties' *actual* working practices, rather than the *theoretical readiness* of single parties to cooperate.

More importantly however, the procedure can be applied to *any number* of dyadic buyer-supplier relationships in a given project. Amidst recent scepticism about the true extent of partnering in construction, it has been pointed out that most of the examples cited, have been at the 'top' of the project supply chain (i.e. between client and contractor) and doubt has been expressed about the relationships between main contractors and the members of *their* supply chains (Greenwood, 2001). A simple and quick *partnering assessment tool* would provide a means of measuring the *overall levels* of cooperative working in a given project – with fully-integrated project supply chains behaving almost as if they were

one company. To do this properly, all the supply chains in that project must have been accurately mapped, and account must be taken of the relative importance of different sub-chains within the project. Nevertheless, this approach would go some way to the offering a useful instrument to analyse the degree of cooperative working between all companies involved in the same supply chain.

8.0. ACKNOWLEDGEMENT

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a 'passport' into Denmark. In essence, this means that the UK bank must fulfill certain criteria laid down by the UK and Danish FSA. Again, this can be a lengthily process therefore it's essential that the right person is identified to execute this task.

5.10 Public Relations

Sufficient resources must be invested into Public Relations. It's essential that the UK Bank effectively communicate its Danish operation not only to the Danish public but also its UK stakeholders. Communications must be delivered in a way that enhances the UK Banks prestige and creates goodwill. Resources will be required to promote the organization by way of radio or television interviews and press releases etc.

5.11 Security

Adequate resource will need to be made available to ensure all security issues are addressed from a customer, employee and company perspective.

6.0 CRITICAL ANALYSIS OF THE ORGANISATION AND MARKET

This section of the report critically analyses the proposal:-

6.1 Advantages of the proposal

Potentially the UK Bank could derive the following advantages from the proposal:-

- Securing deposits from Danish residents will be used to facilitate UK lending targets
- Assist in raising global awareness of the UK Bank
- Provide an initial base in the Nordic and Scandinavian market which will be exploited in the short to medium term
- Provide a learning experience of opening a UK banking operation in a country that does not speak English as a first language
- Create collaborative working relationships in the Nordic and Scandinavian market
- Spread risk as a result of deposits not being concentrated in one country

6.2 Disadvantages of the proposal

Potential disadvantages for the UK Bank are:-

- Lack of experience in establishing an operation in a country where English isn't spoken as a first language could result in many delays
- Unknown reaction of competitors and potential customers
- Limited appreciation and understanding of the Danish market
- Language, cultural, legislation and regulatory differences are likely to take more time to resolve
- Limited appreciation of customer demand could result in unrealistic forecasts being developed
- The timing of 'passport' receipts from the UK and Danish FSA could result in the 'go live' date being postponed
- If not managed carefully, the volatility of exchange rate differences could eliminate profits
- Barriers to market entry may make it incredibly difficult to sustain operations

6.3 Potential problems and proposed solutions

- Exchange rate differences (i.e. £ v Dkr) – issue can be partly addressed by using instruments such as derivatives or forex swaps etc. to protect against adverse foreign exchange movements

- Language difficulties – issue can primarily be address by employing a skilled translator
- Contractual difficulties – issues can be addressed by employing the services of a lawyer specializing in UK and Danish law
- Passporting – issue can be addressed by ensuring that the right person is championed with developing relationships with the UK and Danish FSA
- Assumptions – issue can be addressed by ensuring that all assumptions are validated
- Advertising & promotion – issues can be addressed by ensuring that all advertising and promotion issues are facilitated using Danish specialists
- Assessing Danish Market – issues can be addressed by employing Danish market research and field research specialists to assess the market, potential customers and competition
- Finance – issues can be addressed by ensuring adequate procedures, processes and controls are in place. Its essential that a contingency is built into all budgets to allow for unexpected events
- Cultural differences – issues can be addressed by ensuring that staff working on the project are made aware of Danish culture and accept and respect the culture
- Inadequate resource – issues can be addressed by using realistic estimates for resource. Its essential that some contingency is built into resource allocation
- Forecasts – its essential that forecasts are realistic, and that a contingency is built into all forecasts to account for the impact of unexpected exchange rate differences

6.4 Cost/Benefit analysis

The Danish venture will not break even in its first year of operation primarily due to the 'one off' set up costs. However, financial benefits will materialize in subsequent years where costs will primarily be related to on-going operating costs.

The UK Bank will primarily use the Danish venture as a stepping stone into the Scandinavian and Nordic markets, therefore additional benefits will be derived as the UK Bank expand its operations into other countries.

A high level analysis of forecast revenue & capital costs, along with estimated profit or loss can be found in Table 1.

Table 1.0 Forecast Costs

FORECAST COSTS	**YR 1**	**YR 2**
	£k	**£k**
Capital Costs		
Software development costs	100	
Software maintenance costs	30	23
Purchase of machinery & equipment	150	20
	280	43
Revenue Costs		
Premises set up costs	40	
Rent & Service Charges	50	52
Recruitment costs	140	20
Regulatory/Bank set up fees	40	
Regulatory/Bank maintenance fees	20	23
Salaries	270	300
Training costs	30	10
Travel expenses	20	5
Legal costs	120	30
3rd Party set up costs	60	
3rd Party maintenance costs	30	33
Stationery costs	10	12
	830	485
Expected level of deposits	300,000	360,000
Interest rate on deposits	4.50%	5.00%
Interest rate on lending	6.00%	6.50%
Interest paid on deposits	13,500	18,000
Interest cost on exchange rate differences	1,500	1,700
Interest earned on lending	18,000	23,400
Net interest earned	3,000	3,700
Revenue costs	-830	-485
Estimated depreciation	-56	-65
Forecasts Profit/(Loss)	**2,114**	3,150

7.0 CONCLUSION

In order to facilitate the UK Bank's growth and profitability objectives, it must embark on a change process and prepare itself for the challenges ahead. Providing change is well planned, monitored and controlled with sufficient investment in resource, and then the likelihood of achieving success will increase considerably.

This market report highlights that the UK Bank has many external drivers for change, the key drivers being the UK economy and housing market. Denmark has been identified as an ideal global opportunity for the UK Bank to secure deposits from customers. The report has evaluated the opportunity for the UK Bank to match its business to the target market by clearly identifying the objectives of the change and recognizing the significance of emerging global markets.

Initial indications are that the probability of this venture being successful is high. Substantial market and field research will be conducted and this compounded with a wealth of expertise, collaborative working and excellent communication skills within the UK Bank is a recipe for success.

The UK Bank has clear vision. Leadership and communication within the UK Bank is generally executed in a very effective manner. A desired outcome has been identified, and this will be communicated effectively to all stakeholders which will facilitate the avoidance of confusion and conflict.

The proposed change will be carefully planned; people will be listened to, roles assigned and a plan of action developed. The 'buy in' of key stakeholders will be secured from the outset. The change plan will be monitored to ensure it does not go off track, and once the Danish venture is operational the processes will be assessed with a view to facilitating the similar ventures in the Nordic and Scandinavian markets.

"Some people change when they see the light, others when they feel the heat."

Caroline Schoeder

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Exploring the Attributes of Collaborative Working in Construction Industry

***Shuwei Wu*[1], *David Greenwood*[1], *Glenn Steel*[1]**

ABSTRACT

Due to the increased level of uncertainty of construction market and the variety of building functions, the practitioners in construction need work together more closely, which means a higher degree of collaborative working is often necessary. There is evidence that higher degree of collaborative working can produce more successful projects, but there has been only limited research to examine the definition of collaborative working. The lack of understanding of collaborative working resulted in confusion of application of more collaborative approaches e.g. partnering or alliancing. The work presented here is part of an ongoing PhD study which aims to explore the impact of collaborative working on construction project performance. The aim of this paper is to identify a spectrum of attributes of collaborative working, which will facilitate the understanding what collaborative working is, why collaborative working is needed and how to work together. In order to identify those attributes of collaborative working, the method of '*identification test*' will be adopted, which is based on the recent related literature.

Keywords: attributes of collaborative working, collaborative working and identification test

1 *School of the Built Environment, Northumbria University, Newcastle Upon Tyne NE1 8ST, UK*
E-mail: shuwei.wu@northumbria.ac.uk

1.0 INTRODUCTION

In comparing manufacturing industry and construction industry, the construction has more difficulties in building collaborative relationships and implementation of collaboration because of its fragmentation (Egan, 1998, Bresnen & Marshall, 2000c, Phua, 2006). Construction has been characterized by uncertainty, suspicion and adversarial attitudes for a long time. Fortunately, due to the efforts of the UK government and construction industry, there is a move from traditional, arms-length, contractual approaches towards more collaborative ones which are based on cooperation and trust (Barlow, 1997, Egan, 1998, Wood, 2005). Partnering, particularly, has been cited as one dominant collaborative approach at work and has attracted some empirical investigation in the past decade (Barlow, 1997, Bresnen and Marshall, 2002, Phua, 2006). It has been argued that such collaborative approaches e.g. partnering or alliancing have positive impacts on project performance such as saving cost, better quality, decreasing litigation and promoting greater innovation and improved user satisfaction (CII, 1989, NEDO, 1991, Bennett and Jayes, 1995, 1998).

However, as articulated by Bresnen and Marshall (2000a), less attention has been paid on the systematic investigation of the attributes of collaborative working that might account for these improved outcomes. Collaborative working is not just lip service; it needs participants to put actual efforts and resources on it. Furthermore, collaborative working needs to be done with the right people in a proper way and for proper reasons in suitable projects (Bresnen and Marshall, 2000a, Ng *et al.*, 2002, Eriksson and Pesämaa, 2007). As collaborative working involves lots of issues, Vaaland (2004) argued that it is not easy to achieve a certain appropriate level of collaborative working or even to describe it. But, the people need to work together to deliver value that would be impossible working individually to deliver (Planning Advisory Service, 2007). The Planning Advisory Service (2007) pointed out the underlying reason of people working together is to achieve the synergy generated by combining resources, expertise and ideas from multiple authorities. However, in construction why is collaborative working needed? The following section will explain it in detail.

2.0 REASONS OF WORKING TOGETHER IN CONSTRUCTION

The reason of client and contractor working together is because of their supply-demand relationship. But, working together more closely is because of a variety reasons which could be voluntary by evolutional mechanism or engineered by compulsory mechanism (Bresnen and Marshall, 2002). For instance, an organization collaborates voluntarily to improve internal efficiency (Ellinger, 2000, Fawcett and Magnan, 2002) or is required to collaborate in response to external challenge (Planning Advisory Service, 2007). Particularly, long-term working together can decrease transaction costs through avoiding the repeated tendering costs and saving time. Based on the above description, the paper will examine why they need work together more closely from two perspectives (see fig.1): external forces and internal demands.

- External forces: As the increased complexity of construction technology, the variety of building function, time pressure, the uncertainty and stronger competition in construction market, client and contractor need work together more closely to face those issues (Gidado, 1996, Pietroforte, 1997, Eriksson and Pesämaa, 2007). Through working together more closely, the information and resources are shared to a greater extent, and clients and contractors are viewed as 'partnering or alliancing' to face the challenges from the market (Egan, 1998, Wood, 2005). Thus, the external forces ***push*** the construction companies to work more closely to achieve collaborative advantage which is the synergy generated by combining resources, expertise and ideas from multiple authorities (Planning Advisory Service, 2007).
- Internal demands: Organizations have for many years strived to improve the efficiency of their interactions with their partners (Barratt, 2004). Encouraging collaborative working can facilitate procurement process e.g. early involvement of contractor can make the contractor respond the client's

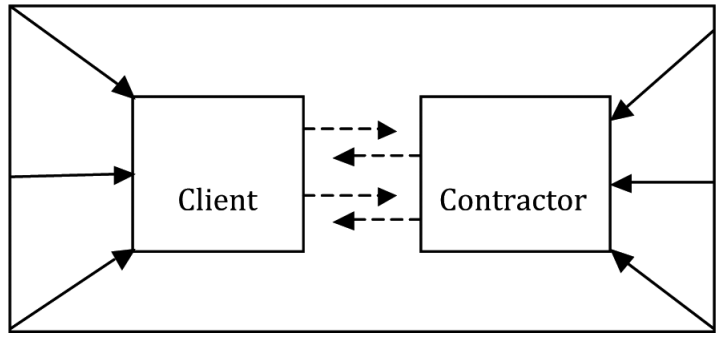
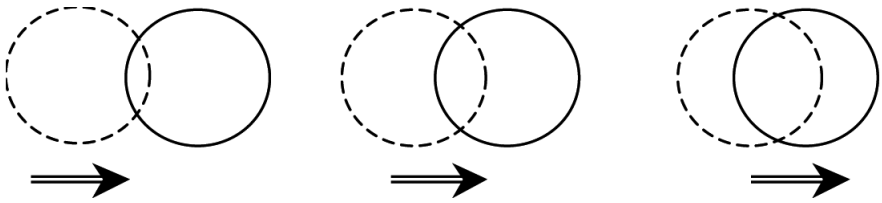


Fig.10 The reasons of working together more closely in construction

requests more quickly and more effectively. Through long-term collaborative working, the client can achieve a higher level satisfaction and better project quality and the contractor can get a more stable workload (Egan, 1998, Wood, 2005). Otherwise, the constant replacement of actors between client and contractor will create cost inefficiencies and time wasting since a new learning curve must be climbed by the actors each time and the process of knowing each other will have to be made (Cox and Thompson, 1997). Thus, internal demands ***attract*** companies to enter into collaborative working to improve efficiency and to lower the transaction cost through changing traditional cultures and building a more collaborative relationship.

3.0 OVERVIEW OF COLLABORATIVE WORKING

When a certain degree of collaborative working occurs, correspondingly two parties working together will have a certain type of business relationship and vice versa. The business relationship between two parties is soft and invisible but it can be reflected by their collaborative working which is hard and visible. Their relationship can be considered as the relationship between temperature (business relationship) and thermometer (collaborative working). Webster (1992) proposed that the range of business relationship can be described as a continuum ranging from pure transaction to vertical integration. Sako (1992) also presented a framework to define business relationship from Arm's-length Contractual Relation (ACR) to Obligational Contractual Relation (OCR). ACR is characterized by specific discrete transactions where there is no mutual trust and commitment. Such relations are often short term or one-off. OCR is typified by high degrees of interdependence, trust and mutual benefits. Such relations are often long term and based on mutual collaboration. So in this continuum, when the degree of collaborative working is increased, the relationship tends towards OCR; otherwise, the relationship tends towards ACR, (see fig.2).



- The dashed circle – ACR
- The solid circle – OCR
- Overlap – Collaborative Working

Fig.2.0 Role of collaborative working from ACR to OCR

Likewise, Cooper and Gardner (1993) identified a range of relationship styles based on lower and higher degree of collaborative working: Arm's length relationship; Typical small account relationship; National account selling; Strategic alliances; Joint ventures; Full vertical integration. In this range of inter-organisational relationships, Macbeth (1994) identified two end points: adversarial and collaborative. Furthermore, Harland (1996) followed this idea by defining the range of partnership (see fig. 3).

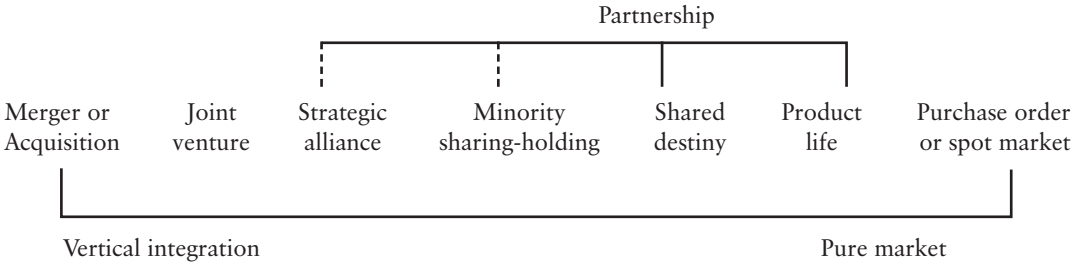


Fig.3.0 Partnership as on certain relationship (adapted from Harland, 1996)

One extreme side of the continuum represents a pure market, in which the degree of collaborative working is very low; the other extreme side is merger & acquisition, in which the degree of collaborative working is very high. In this spectrum, partnering from 'product life' to 'strategic alliance' could be viewed as a certain type of collaborative working. In construction industry, partnering has been viewed as a major form of collaborative working, which represents a significant change; another perspective for tackling fragmentation and the lack of integration; improving project performance; and counteracting traditional adversarial working environments (Egan, 1998, Bresnen and Marshall, 2000c, Dainty *et al.*, 2001, Wood and Ellis, 2005, Phua, 2006). However, partnering is a type of collaborative working. It could not represent all of collaborative working. Collaborative working is a broader concept than partnering. It is necessary to explore a full spectrum of collaborative working rather than just focus on partnering. In order to differentiate partnering and collaborative working, the definition of collaborative working needs to be clarified.

4.0 DEFINITION OF COLLABORATIVE WORKING

'Collaborate' from Latin is comprised by 'col (together)' + 'lab (work)', which means working together (Oxford English Dictionary). By definition, all organizations or people working together are collaborating. Through collaborative working, people can achieve better results than working separately. Based on this, this research defines collaborative working as ***client and contractor jointly working together for mutual advantages, through which they can achieve bigger benefits than working separately***. In terms of the suggestion of understanding partnering by Tyler and Matthews (1996), collaborative working also can be understood in two ways: firstly, by its 'attributes' such as commitment, trust and win-win philosophy and secondly by the 'process' such as achieving mutual benefits in terms of setting mutual goals through organizing workshops to communicate to each other. Long-term collaborative working can be understood as a type of procurement method e.g. strategic partnering. Short-term collaborative working can be understood as the specific interaction amongst construction participants in the project delivery process.

Collaborative working can be effective or ineffective. The different degree of collaborative working could be expressed by a variety of indicators or attributes e.g. trust, commitment and so forth. This paper will explore attributes of collaborative working which determine the degree of collaborative working. In order to achieve this objective, an *identification test* will be adopted. The next section will introduce how to identify those attributes and the results of *identification test*, which will facilitate the measurement of degrees of collaborative working (CW).

5.0 IDENTIFYING THE ATTRIBUTES OF CW

This section will introduce how to identify the attributes of collaborative working. This will comprise three parts. Firstly, the method used to identify attributes will be explained. Secondly, a sample of identification test will be presented. Meanwhile, why and how to choose this sample will be explained. Thirdly, the result of test will be compared with the previous research and then the final result will be identified.

5.1 Identification test

Identification test refers to the identification of key issues from the past literature through collecting related key words from the target literature source. This method is especially useful to investigate those issues which are close with past literature but currently few people do it. This approach has been used by several researchers e.g. Tyler and Mathhews (1996), Li *et al.* (2000) and Chan *et al.* (2003). Noticeably, Tyler and Mathhews (1996) used an identification test to explore the elements of partnering. In their research, they reviewed total 20 papers (from 1990 to 1996) and a total of 117 phrases or key words were identified of which 18 were different. There are a 10 of prevalent phrases or key words identified. The specific results please see Table 1.

Table 1 presents the results identified by Tyler and Mathhews (1996), which are the key elements of partnering. Partnering, as a certain type of collaborative working, not only has some similarities with collaborative working but also has some differences. Therefore, differences and similarities can be identified. Also, some changes of elements of collaborative working could be examined from a longitudinal perspective. For instance, in the collaborative process as the time goes by, some elements may become more important and some may become less important, which could be identified by comparing their ranks at different times.

Table 1.0 Key elements of partnering (source from Tyler and Matthews, 1996)

	Most Prevalent Elements to Partnering	Frequency mentioned
1	Goals and Objectives	14
2	Trust	14
3	Problem Resolution	13
4	Commitment	12
5	Continuous Evaluation	7
6	Group Working / Teams	7
7	Equity	6
8	Shared Risk	3
9	Win-Win Philosophy	3
10	Collaboration / Co-operation	2

5.2 The list of papers chosen in identification test

This paper will review the articles published in the last 11 years (1996 to 2007) which are from five major construction management journals:

- Construction Management and Economics
- Journal of Construction Engineering and Management
- Engineering, Construction and Architectural Management
- Journal of Management in Engineering
- International Journal of Project Management.

These target journals have been given the higher scores regarding quality by Wing (1997) and the articles from those journals are widely cited by other researchers. The papers from these journals are appropriate to be the sample for identification test in this research. The above five journals (except International Journal of Project Management) have ever been used by Li *et al*. (2000), in which they reviewed last 10 years published papers and made a detailed examination of partnering research. In this research, a total of 26 published related papers are identified. The criteria of selecting sample articles please see table 2.

Table 2.0 The criteria of selecting sample articles

Year of paper published		Location of sample paper	Primary content of papers
1997: 1 paper	1998:1 paper	UK	Those are closely related to collaborative working e.g. collaboration, cooperation and partnering etc.
2000: 5 papers	2000: 4 papers	Hongkong (PRC)	
2002: 2 papers	2003: 1 paper	Sweden	
2004: 6 papers	2005: 4 papers	Singapore	
2007: 2 papers			

The specific method of choosing paper sample from target journals is to search key words from the title and abstract, such as partnering, alliancing, partnership, collaboration, collaborative working which is closely related to research topic. In particular, Phua (2004) and Phua and Rowlinson (2004) used the grounded and inductive approach to explore collaboration and its relationship with project success. In contrast, Chua *et al.* (1999), Black *et al.* (2000), Chan *et al.* (2001), Beach *et al.* (2005) used deductive and normative approach to investigate collaboration and its relationship with project success. Thus, this research has covered a broad range of papers which aims to examine collaborative working in different ways. The detailed summary of reviewed papers, please see table 3. They are listed in terms of date and alphabetical order (in same year).

Table 3.0 Sample papers

Paper number	Author and time	Contents of paper
1	(Crane *et al.*, 1997)	They developed one model to measure partnering. In this model, the measures are closely connected with the collaboration.
2	(Thompson and Sanders, 1998)	They gave a continuum of partnering and explain the relationship between different types of partnering.
3	(Black *et al.*, 2000)	They made a detailed analysis of success factors in partnering.
4	(Bresnen and Marshall, 2000a)	They used case study to describe how to build collaborative relationship.
5	(Bresnen and Marshall, 2000b)	The relationships among motivation, commitment and incentives are explained in partnerships and alliances.
6	(Cheng *et al.*, 2000)	They explored critical success factors for construction partnering. Especially, they developed good measures to measure those factors.
7	(Li *et al.*, 2000)	They detailedly reviewed the partnering in the literature and summarized the partnering research in the past.
8	(Cheng and Li, 2001)	They developed a conceptual model to build partnering: from partnering formation, application, completion and reactivation to success.
9	(Kwan and Ofori, 2001)	The relationship between Chinese culture and successful implementation of partnering has been examined.
10	(Li *et al.*, 2001)	They referred to partnering as an alliance and defined four level of partnering.
11	(Liu and Fellows, 2001)	They examined the nature and process of partnering from an eastern perspective.
12	(Bresnen and Marshall, 2002)	They argued whether the cooperation is engineered or evolutional through two case studies.

13	(Cheng and Li, 2002)	A quantitative investigation about critical success factors has been made at three different stages: partnering formation, application, completion and reactivation
14	(Chan *et al.*, 2003)	They examined the problems for implementation of partnering in construction.
15	(Chan *et al.*, 2004)	They identified essential ingredients for partnering success and refined partnering success factor via factor analysis.
16	(Kadefors, 2004)	Detailed description of trust in project relationship
17	(Phua, 2004)	The research is a grounded exploration about determinants of project success.
18	(Phua and Rowlinson, 2004)	They explore the relationship between cooperation and project success.
19	(Vaaland, 2004)	Detailed description of role of confliction in collaboration.
20	(Wong and Cheung, 2004)	Examination of trust from different parties in partnering.
21	(Beach *et al.*, 2005)	Good evaluation of partnership: market relationships, vertical integration, partnering and strategic and project partnering.
22	(Nyström, 2005)	A very good description of partnering definition has been made via Wittgenstein family resemblance
23	(Wong and Cheung, 2005)	Structural equation model of trust and partnering success is built.
24	(Wood and Ellis, 2005)	Detailed description of experiences of partnering relationships from main contractor perspective.
25	(Lu and Yan, 2007)	A model is build to evaluate the applicability of partnering in China construction and identify the factors affecting partnering use.
26	(Yeung *et al.*, 2007)	A very good description of alliancing definition has been made via Wittgenstein family resemblance

5.3 Result of identification test

Through the critical review of the above 26 articles, a set of key words/ phrases have been identified which are mentioned in those articles as key aspects of collaborative working. The detailed results of this test are followed as Table 4.

Table 4.0 Results of identification test

	Attributes of CW	No. of paper	Frequency mentioned	
			This research	Previous research
1	Trust	2,3,4,6,7,8,9,10,11,13,14,15,16,20, 21,22,25,26	18	14
2	Commitment	3,4,5,6,7,8,10,11,13,14,15,21,25,26	14	12
3	Problem Resolution	2,6,8,10,11,14,15,16,19,20,21,22, 23,25,26	15	13
4	communication	3,6,8,10,13,14,15,17,18,20,21,23,26	13	
5	Goals & Objectives	1,2,4,6,7,10,11,13, 21,24,25,26	12	14
6	Collaboration/Cooperation	4,6,7,8,10,11,13,15,17,18,24,26	12	2
7	innovation, creativity	6,7,8,10,11,15,17,18,20,22,23	11	
8	Shared Risk & interests (Equity)	2,3,7,10,11,14,17,18,22,24,26	11	3
9	Continuous Evaluation	1,2,3,8,10,14,16,21,22,25,26	11	7
10	Contracts, incentives	2,4,5,8,12,13,17,18,20,22,26	11	
11	Group Working\ teamwork	2,4,8,10,12,13,21,24,25	9	7
12	Attitude: learning and sharing	2,3,8,12,13,14,15,21,24	9	
13	Top management	6,7,8,13,14,15,22,25,26	9	
14	Mutuality, respect, mutual understanding	3,9,12,14,20,22,23,25	8	
15	Openness	2,8,10,20,22,23,24	7	
16	equality	10,11,17,18,21,26	6	6
17	Adequate resources	3,6,8,13,15,22,26	7	
18	Win-Win Philosophy	1,2,10,15,26	5	3
19	cost-driven, value	3,10,11,15,24	5	
20	Organizing, managing the project team	4,15,21,22,26	5	

Note: previous research refers to the research undertaken by Tyler and Matthews (1996)

Those words which occurred more than four times have been chosen. The other standards of choosing those words are:

- The author of paper considered them to be important in the implementation of collaborative working
- Those words can mostly reflect the characteristics and essence of collaborative working
- Those words are most representative of collaborative working or have closest meaning with collaborative working
- Those words are common in construction industry

In the process of screening attributes, the author incorporated some words into the same category. For example, benchmarking has been put into the range of continuous evaluation, and honesty and kindness have been put into the range of attitudes and so on. Some of them achieved high scores, such as charters, facilitation, facilitator, however, they are not this research is seeking for. Thus they have been deleted or incorporated into other categories.

From the table 4, there is no large difference in the comparison with the research by Tyler and Matthews (1996). However, there still are some new points such as good and open communication, technological innovation and creativity which are the essence of collaborative working as well but Tyler and Matthews omitted them. It is noticeably that, it does have some significant differences of item rank from a longitudinal perspective e.g. collaboration/cooperation and shared risk & interests (equity) become more important, comparing with their ranks in previous research.

Furthermore, connected with two seminal research projects by Mohr and Spekman (1994) and Lehtonen (2004), the former identified the key attributes of partnership: commitment, coordination, interdependence and trust; the latter summarized the attributes of partnering relations as: mutual trust, commitment, openness, sharing of risks and benefits, continuous development, involvement of all organisational levels. Finally, this research can identify the attributes of collaborative working: trust, commitment, sharing of risks/benefits (equity), interdependence, continuous evaluation/development, mutual goals/objectives, problem resolution, team working, collaboration/cooperation, equality, win/win philosophy, communication, mutual understanding/respect, innovation and creativity. Some of the above words/phrases need further modification and incorporation in terms of the future research requirements.

6.0 SUMMARY

Exploring and identifying the attributes of collaborative working can help get a better understanding of how people should work together. In particular, it can help practitioners to remove the confusion of collaborative working in construction and facilitate the application of collaborative working. The research distinguishes partnering from collaborative working and presents a definition of collaborative working. By this definition, the relationship between collaborative working and business relationship has been examined. Particularly, the research presented the role of collaborative working in the business relationship evolution process from Arm's-length Contractual Relation (ACR) to Obligational Contractual Relation (OCR). Under different business relationships, there must be a certain degree of collaborative working which is determined by its attributes e.g. trust, commitment and so forth. In order to get a spectrum of attributes of collaborative working, *'identification test'* has been adopted. Based on the results of identification test, further research will develop a measurement methodology to measure the different degrees of collaborative working. However, since all attributes obtained are from literature, there is still a need to test them with practitioners from industry and then make a final conclusion.

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A River of Risk: A Diagram of The History and Historiography of Risk Management

Naomi V. Hay-Gibson[1]

ABSTRACT

The history of risk and risk management can be evaluated through the historiography of the subject. Writings on the history of risk and risk management can also be treated as pieces of evidence. A diagram is proposed describing some of the subjects and events influencing the development of risk management, focused through the theme of records management. A detailed exploration of the historiography is undertaken to indicate the relevance of the history of risk management to its present interdisciplinary status.

Keywords: Information management, Risk, Risk Management, Records Management

1 *School of Computing, Engineering and Information Science, Northumbria University, Pandon Building, Newcastle upon Tyne, NE1 8ST, UK*
E-mail: naomi.hay-gibson@northumbria.ac.uk

1.0 INTRODUCTION: WHAT IS 'RISK'?

'Risk' is a term often used as a synonym for danger or hazards. More accurately, it describes a chance of an event's occurrence in terms of its likelihood, usually with a negative connotation - especially in the context of such subjects as finance. Risk, as this article postulates, is a transdisciplinary subject: it is found from the construction industry to records management. Risk can be viewed as the chance of an event happening as well as the measure of how much of a negative impact the event carries. Risk management is the act of assessing and reacting to risk, as well as interpreting risk either by itself or within a specific discipline. Risk is also used as a description of the outcomes of particular scenarios, such as drinking more units of alcohol than recommended per week, or smoking in excess of X cigarettes per day.

Works on the nature of risk now serve as our guides (literally and figuratively) and act as 'records' of our developing attitudes towards risk as a trans-discipline. Records management and risk are more intimately linked than previously thought (Saffady, 2005). Although archivists and information managers understand what practical risk there can be to our records, there is also scope for using our records as historians do, to describe the evolution of our thoughts about risk. Although there have been overviews of the history of risk (Bernstein, 1996; Barlow, 1993; Covello & Mumpower, 1985; Thompson, et al., 2005 & Althaus, 2005) and views on general risk management (Lemieux, 2004) - especially within the area of risk and 'disasters' which touch more than one discipline (Felix Kloman, 1999) - there is a lack of general historiographical writing on the subject of risk management which places the concept of transdisciplinarity into focus. An overview of this subject is necessary to briefly evaluate the historiography of risk in order to show us from where we have come.

This article proposes that even a brief evaluation of some of the articles and works written within a 50-year period can lead to a greater understanding of the origin of themes in risk management, and the possible origin of terms within the discipline of risk management. The main area of research interest for the author is that of risk management within records management, a subject not yet fully explored in literature.

There can be few disciplines in which there is little or no need for risk awareness. Within this article, an identification of technology as a driver for risk management demonstrates changes in perception of risk, and illustrates some of the current areas for concern in risk management. Historical events as drivers for risk management are also considered. The philosophy of risk is specifically omitted, as a transdisciplinary review of this could encompass another article by itself. The work concludes with thoughts on where this review may lead the transdisciplinary study of risk management. It is envisaged that this will become an important step in ensuing research which is focussed on risk management within records management.

2.0 'RIVER OF RISK'

Proposing that the history of risk management is traceable from several branches of events, technologies and disciplines, an apt diagram for examining this history is the tree diagram – here described as a 'river' whose confluences and sources run towards the creation of a disciplinary flow . Although simplifying events, it serves to clarify some placement of events and influencing factors within the growth and development of risk management in the last 50 years, albeit with many of the major works on risk retrospectives in the later half of this period. This diagram was developed from research about the history of risk management within records management, and was expanded to illustrate the areas connected with the history of risk management. The image is thematic and looks at a general progression of the advance of risk management as a discipline, rather than as a chronological one.

The image was developed in light of the fact that there has been no graphical representation of the findings of some of the major works such as Althaus (2005) and Thompson, Et al., 2005. The inspiration to create a graphical representation came initially from Felix Kloman's (1999) study on milestones which showed

a simple linear chronology of risk events. The concept of merging themes to show an overall convergence into an accepted understanding of 'risk' has not, to the researcher's knowledge, been found elsewhere. Basing research on the viewpoint of a historian, the researcher sought to create a timeline image which showed the current reflections on risk management, as well as noting some of the key risk events themselves, following Felix Kloman's (1999) example.

2.1 Examining the diagram

The author has adopted a developmental approach describing the historiographical evolution of risk as a discipline and cross-discipline in diagrammatic form. The diagram of the 'river of risk' graphically describes some of the historical development of risk management. Topics and their offshoots, such as 'mathematics' and 'decision theory' are linked thematically rather than chronologically. This is a different approach compared with other works - Covello and Mumpower (1985) do not use thematic linkage, and instead use chronological linking to describe the evolution of risk management. Althaus (2005) examined her structure of the history of risk theory as a discipline review concentrating on works, with transdisciplinary scope, but no assessment of historicity of the trans-discipline as a whole. This paper therefore provides a form of examination of the thematic linkages between the topics and disciplines involved with risk management throughout a period of 50 years that has not been formally explored.

The 'river of risk' image serves to illustrate the kinds of interdisciplinary links that can occur within risk management. It is difficult to map these interdisciplinary links onto a chronological framework. Technological changes, such as advances in computing science, are usually cumulative and therefore do not 'end' in a specific time period. These influences may continue for a long time, and may not 'die out'. One example is that of decision theory. This discipline still forms an influence on risk management. Management practices themselves inform risk management. Arrows indicate the areas where there may be influence from one field of thought or history to another, e.g. events such as the Enron disaster (McLean & Elkind, 2004) linking to the area of risk analysis – practical risk. The Enron disaster itself strays into the area of risk legislation – The Sarbanes-Oxley Act (2001) was not the first to be enacted which dealt with data, but was certainly regarded as one which had effected change in risk management as well as data management (Cone, 2006; Ribstine, 2005; Ryan, 2004).

3.0 EARLY HISTORY OF RISK AND RISK MANAGEMENT

Within this study, the history of risk management has been traced back for approximately 50 years. However, there is no consensus on the different dates for offered within the articles. Krimsky & Plough (1988) trace the origin of risk awareness back to Ancient Mesopotamia, based on the work by Covello and Mumpower (1985), as do Golding (1992) and Thompson, et al. (2005). Althaus (2005) traces a more linear and detailed postulated development through linguistics of the term 'risk'. In reviewing the literature, there is support for the idea that risk management in its earliest developed stages was an offshoot from 'decision theory', evidenced by Bannister and Bawcutt (1981) as well as Althaus (2005) from the work of Arrow (1965), a work which discussed chance and probability in mathematical terms. Decision theory, discussed by Thomas (1972) notes the term 'risky' in a description of a problem of probability. However, the same work also states that decision theory has "…existed for about two decades", thus giving us both a puzzle and a starting point. From this evidence, we can deduce that decision theory had 'started' at a point in the 1950s, but we are not given the area from which it sprang. The most likely explanation is from the discipline of mathematics, as is posited by some of Althaus's work (2005). Boyne, (2003) within his comprehensive work on risk, refutes this in some instances. Rescher (1983) notes more practically the connections between probability in the case of risk events. Giddens (1998) notes that risk is a profoundly modern phenomenon, and dates the emergence of the conceptual term of 'risk' from the European Middle Ages. The development of management science, from some of its beginnings with the theorists such as Fayol (1988) and Cole (1990), led to the possibility of management's decisions becoming

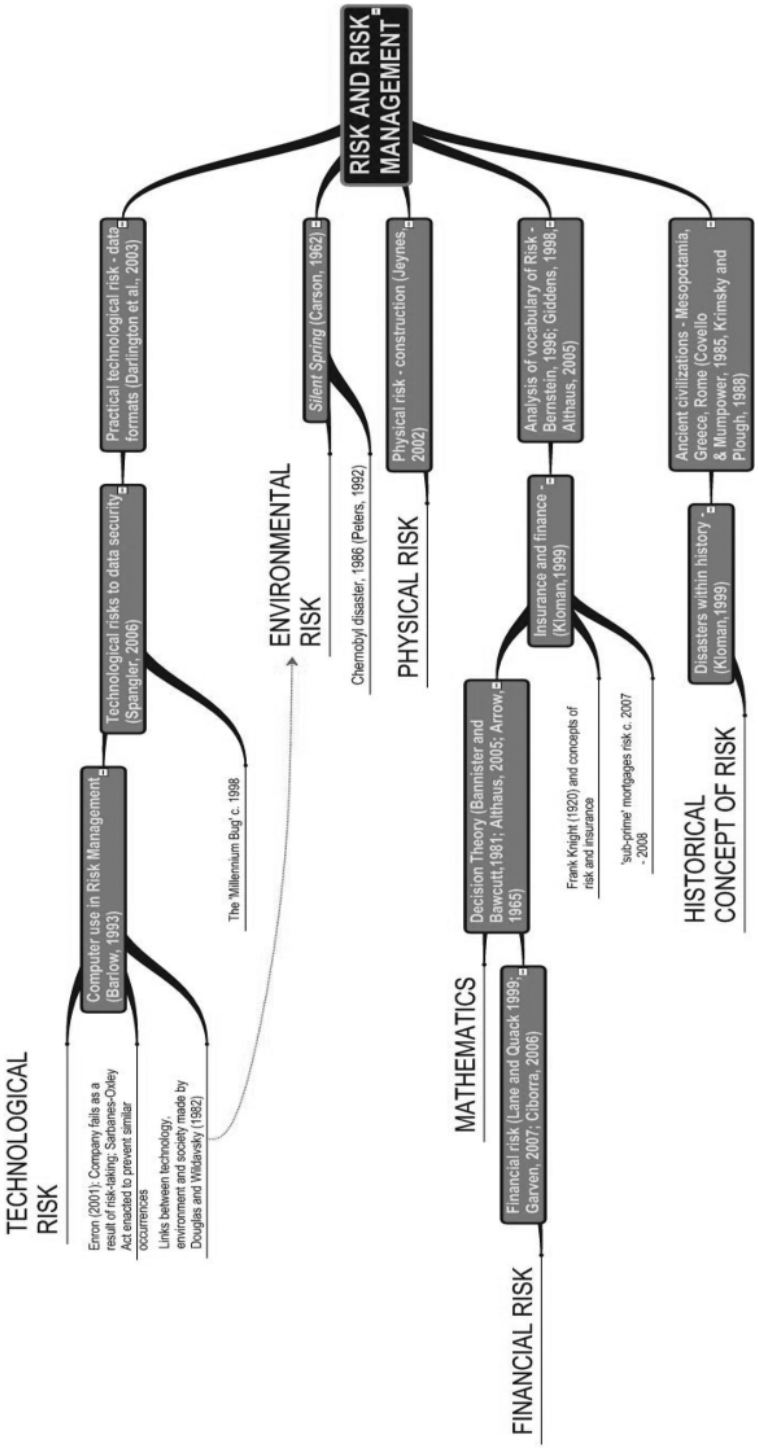

Figure 1: Diagram of the 'river of risk' - an n illustration of risk management history and historiography

rationalised as researchable subjects. Felix Kloman (1999) notes that in 1955, Dr. W. Snider of Pennsylvania University suggested to Dr. H. Denenburg that "the professional insurance manager should be a risk manager". Felix Kloman links this to Denenburg's later exploration of the ideas described in Fayol (1988), and in doing so, has provided one of the answers to the possible roots of risk management within other areas other than finance. Decision Theory, a form of management science looking specifically at risk in finance or risk as expressed through logical propositions, may have been one of the precursors of risk management, and had been discussed in an early volume (Arrow, 1965) which was later expanded upon in regards to 'risk-bearing'. Kleindorfer et al. (1993) have a broad view of the 'disciplinary roots' of decision sciences, as well as its legacy to other disciplines. Specifically identifying areas such as information systems and industrial organization, Kleindorfer et al. (1993) made a clear alignment with decision making and some of the fields where risk management is currently used. This work also mentions risk, but crucially does not equate risk with decision making.

4.0 HISTORICAL SOURCES FOR RISK

According to Covello and Mumpower (1985), an optimistically early dating of the practice of risk analysis is that of the time of ancient Mesopotamia, as well as ancient Greece and Rome, the former relating to sacerdotal practice and the latter to the history of philosophy (Covello and Mumpower, 1985). The main consideration of Covello and Mumpower's statements about the history of risk are that they are generic. A later statement about causality mentions the work Airs, Waters, Places "…thought to have been written by Hippocrates in the 4th or 5th century B.C." (Covello and Mumpower, 1985) However, there has been doubt cast on the singular nature of Hippocrates as the author of the whole 'Hippocratic Corpus' since 1945 (Jones, 1945) and this therefore casts doubt on the detailed nature of the rest of the archaic historical evidence that the paper expounds. It may be best to leave the speculation of the early historical origin of risk to an evaluative stance. Others have successfully expounded on the early philosophical history of risk, and yet others have continued in this tradition (Thompson, 1986, Luhmann, 1993, Rescher, 1983), showing an awareness that risk philosophy continues to grow in scope and stance. However, the use of the concept of risk within ancient philosophy has a large scope, and is too complex to investigate sufficiently within this article.

In terms of early historical examples cited by modern writers, Bernstein (1996) cites the St Petersburg Paradox as one of the first examples of risk assessment, based on the use of probability to assess the potential benefits of a hypothetical merchant sending a cargo in a poor season. Arrow (1965) also mentions this work, and references its earliest English translation by Sommer in 1954, from the German translation of Pringsheim in 1896, which in turn was translated from the 1738 Latin of Bernoulli (Bernoulli, 1738) (*See the footnote in Arrow, 1965, p.57*). Althaus (2005) traces the terminology of risk back far earlier, and has noted that the terminology for the Latinate term 'riscare', and then a possible derivation from Portuguese:

"The Oxford English Dictionary (OED) suggests risk dates as a word from the 17th century, with the origin thought to be from the Italian risco, riscare, rischiare…Many commentators link the emergence of the word and concept with early maritime ventures in the premodern period, with Giddens suggesting the word came to English from the Portuguese or Spanish where it was used to refer to sailing into uncharted waters (Chambers Twentieth Century Dictionary explains the Spanish 'risco' refers to "a rock"; Giddens says that one root of the term risk in the original Portuguese means 'to dare' (Althaus, 2005, p.570)

Bernstein (1996) marks the use of the terminology and concept of risk from the 16th century CE, following the conclusion of Covello and Mumpower (1985) that the later sophistication of this period enabled further development in the science:

"…it was not until the emergence of probability theory in the 17th century that the intellectual tools for quantitative risk analysis became available."

(Covello and Mumpower, 1985)

Felix Kloman (Felix Kloman, 1999) takes a more objective stance to the history of risk, looking at the wide range of events which propagated risk as formative and causative:

"The major wars, from the Russo-Japanese, World Wars I and II, and Korea, to the regional conflicts that have followed, the advent of the automobile, radio, television and the computer, the Great Depression, global warming, the atom bomb and nuclear power, the rise and fall of communism, derivatives fiascoes, and the entire environmental movement have affected the development of risk management." (Felix Kloman, 1999)

The citation of these events is made as specific incidents of risk have created an effect which "stimulated the discipline" (Felix Kloman, 1999) and therefore have encouraged its growth or given risk management a new direction. Aside from the obvious stimuli for risk management – disasters, such as Chernobyl – there are less evident events where risk management can be seen as a cross-discipline aspect of the aftermath of the event. One such event which Kloman cites as a milestone for risk is the formation in 1920 of the first captive insurance company, Tanker Insurance Company, Ltd. This insurance company is thought by Kloman (1999) to have started "… a movement that exploded in the 1970s and 1980s" (Felix Kloman, 1999). This is an explicit link with an event in time that shows a specific effect with finance, insurance and risk. This is a form of speculative historiography about the history of risk analysis and management, and it is not usually evoked by works discussing the discipline of risk management. The difference is that Kloman (1999) developed a history of risk management which is not strictly linear. Instead, it is charted by development rather than by chronology – although chronology is helpful in ordering the evolution of aspects of risk management.

As we have seen, risk has been perceived by its historiographers as having a specific historical origin grounded in such concepts as finance and physical types of risk. Further description of these areas is necessary to investigate these perceptions.

5.0 RISK TYPES – SUB-THEMES OF RISK

5.1 Financial Risk

Financial risk is usually linked with insurance (Bernstein, 1996, Holmes, 2002). This is one of the older areas of the history of risk that uses the term 'risk' explicitly to describe activities or factors of liability in activities. Linked to the history of probability, and using calculations to predict factors vital for insurance purposes (such as life expectance tables), finance remains an area that deals with risk – though the term now has a multidisciplinary use, it still retains within this topic a sense of its historical origins. It takes on a different and specialised meaning. Finance is a specific discipline area from where it could be successfully argued the terminology of risk originated. Covello & Mumpower (1985) emphasise the development of quantitative risk analysis from this area, stating that "It would be difficult, if not impossible, to separate contemporary risk analysis from mathematical notions of probability." (Covello and Mumpower, 1985).

Financial risk can comprise several subgroups of risk, which are specifically associated with banking and finance. These are attributed by subject, e.g. operational, reputational and counterparty risk (Martin and Beans, 2000). Martin and Beans (2000) define operational risk in finance with Royal Bank's description: "Royal Bank defines operational risk as all of those items that can lead to risk due to a break down in processes and actions of people both internally and externally" (Martin and Beans, 2000). Risk within finance, at the time of writing, has also moved into the public consciousness with the 'risk' and impact of sub-prime mortgages now being discussed and planned for by the Bank of England (BBC News, 2008).

Moving to a related area in financial risk which also segues into generic risk management is the concept that risk can be avoided. One of the first uses of the concept of 'risk aversion' was defined in the terms of one who avoids risk within a financial topos:

"A risk averter is defined as one who, starting from a position of certainty, is unwilling to take a bet which is actuarially fair…" (Arrow, 1965)

The concept of risk aversion is mentioned in modern literature dealing with generic risk. The HSE (Health and Safety Executive, 2001) use the term 'aversion' in the sense of risk aversion whilst discussing prevention of fatalities and reducing fatal risks. In this instance, higher (monetary) value of risk management – the concept of placing a value on such usually inestimable items as people's lives - is more appropriate "for risks for which people appear to have a high aversion".

Lane and Quack (1999) show a confluence of the philosophy of risk in their work, by allying business risk – in this instance, financial - with sociological risk. This approach can be traced to such authors as Douglas and Wildavsky (1982), as well as Luhmann (1993). This gives us another set of correlating points towards the early 1980s and 1990s as periods where the concept of 'risk' had expanded towards other areas, as Kleindorfer (1993) has explored, but not given time periods to.

Garven (2007) has noted the impact of risk to finance, and also cites his sources as being historically-influenced (Garven, 2007) An extension within the areas of finance has been that of risk as a generic term for certain types of financial calculations, as can be seen in Ciborra (2006). However, this form of risk could be thought of as a distinct and separate (though possibly self-developing) strand of the history of risk management. Other further developments, or rather offshoots of the use of risk management within finance, have been the use of risk management tools within a financial framework (Gopal et al., 2005) thereby bringing a historical element back into the study: a sign of the circle of the history of risk management becoming a spiral which feeds back upon itself.

Rescher (1983) makes a very clear modern link between the probabilities of risk in multiple situations with mathematical diagrams of decisions and probability. However, he also uses these same diagrams to illustrate the oldest philosophical paradoxes, such as Pascal's Wager – the wager of whether it would be better to believe or disbelieve in God. Thompson (1986) looking in a historiographical perspective (*particularly reflecting on the problematic cruces in Rescher's text*) noted that this stance comes from Knight's work in 1920 (Knight, 1964):

"A tradition of thought which can be traced to Frank Knight's pioneering text on risk and uncertainty distinguishes between chance – the genuinely random potential for change in the universe – and probability, which may simply be a conditional description or prediction that substitutes for complete description when knowledge of full causal conditions is incomplete." (Thompson, 1986)

One spate of the 'river of risk' historiographically then can be traced from Knight (showing a connection between probability, finance and risk) through Rescher's concept of mathematical interpretation of risk (1983) and Thompson's philosophical viewpoint (1986). The awareness of the role of probability and finance in the discipline of risk and risk management is rather better documented than in other risk disciplines.

A philosophy of risk which picks out financial risk also looks at environmental risk as main topics for the text (Giddens, 1998). The text itself notes the ideas of other texts which describe the phenomena of financial risk situations, such as the collapse of Barings Bank (Giddens, 1998). In doing so, it can be seen that risk subjects have a certain degree of intertextuality. It is more likely than not that a work which mentions one type of risk will mention more within the context.

5.2 Physical and environmental risk

Risk management within areas such as construction, or areas where health and safety may be concerned are also involved in the output of articles and works on risk management. They are also some of the better sources for glossaries of risk vocabulary, as they are very specific about terminologies used within the publications.

Jeynes' (2002) publication of the 10 principles of risk management pertains solely to the management of

risks in the physical and practical risk areas, such as industry. However, Jeynes' work states that each named risk management principle is itself representative of its own 'type' of risk. These risk principles, in such areas as 'performance' and 'purchasing' are clearly industry-linked. However, it again shows that risk management is put into categories by those handling it. 'Performance', according to Jeynes (Jeynes, 2002) covers "targets set, monitoring, measurement tools, consistency, [and] validity of data'. The emphasis that these principles deal with physical, tangible things should not be ignored and the ideas subsumed under the general heading of risk management. There is, within this document, proof that risk is being seen as a measurable factor which can be sorted according to the type of object it affects; in this case, physical items or practices.

Environmental risk, connected intrinsically to technological risk in recent years (See Douglas and Wildavsky, 1982), deals with risk which has an ecological and social ramification, such as Peters (1992) and his work on the perception of the information dissemination at the time of the Chernobyl disaster in 1986. One of the first works in this genre was Rachel Carson's seminal volume, Silent Spring (Carson, 1962). This volume is, amongst other things, proof that risk can make a successful transdisciplinary input. Douglas and Wildavsky's work (1982) was the result of an ethnographical approach to an identification of social conditions as related to the perception of risk (Wuthnow et al., 1984).

5.3 Technological Risk

The scope of technological risk is great, and therefore can only be represented within this model by some points narrating basic concerns. Technological advances have opened up the field of risk management significantly. Barlow (1993) notes that "computers have radically changed the scene for risk managers…They help risk managers do a better job. And they have also brought new risks, some of high challenge to perception and control." (Barlow, 1993)

Data security and the security of records forms a major part of records management awareness; something which affects all disciplines and businesses. Practical technologically-linked new risks have been noted by Spangler (2006), who includes a comment from 'IT executives' in that "portable storage devices – namely, thumb-sized USB drives- scare them more than the possibility of a laptop vanishing" (Spangler, 2006). Technological advances show the need for 'technology risk management'; in this case, coping with the problem of security where technology has provided mechanisms for bypassing usual secure procedure. However, technological risk is not limited to security problems alone. Technological threats such as viruses are an external risk to computer users, but during the turn of the last century, the 'Millennium Bug', a proposed error in computing systems that would alter dates and confuse the calculations of computers, was considered a big enough risk to have significant preparation made to mitigate its effect (BBC News, 1998).

The advancement of the personal computer means that data storage and movement is now a commonplace in everyday life. The availability and longevity of data formats is therefore a valid concern. Darlington, Finney and Pearce (2003) were involved in reconstructing a computer program and database from 1986 that was in danger of becoming unreadable because of the format it was recorded on. The availability of hardware and software with which to access data is also a concern that should be noted. At the time of writing, the file format created by Adobe (2007) known as the PDF (Portable Document Format) has become ubiquitous, and Adobe placed the format for consideration as a set standard with the ISO committee (Adobe Systems Incorporated, 2007), since approved as BS ISO 19005 – 1: 2005. However, the possibilities of future technology are unknown. Developers of software for PC operating systems were warned that for Microsoft's Vista OS (Microsoft, 2007) there may be issues with extant software, and that this would have to be addressed (CNET Networks Inc., 2007). Disparity between an older file format and a newer piece of hardware – or vice-versa – may result in the risk of data being permanently lost.

6.0 CONCLUSIONS

The development of risk management has been that from a posited start in the ancient world, with evidence accreting for the development of the subject from the 16th century CE onwards. In terms of historiographical research, the path of development of risk management has not been clear. Instead, what has emerged from the historical evidence of papers and of terminology development is that risk as both a social and academic subject has both expanded and lost contact with some of its roots, taking on board such technical and socio-cultural events as the advent of war, and the construction of the backbone of telecommunications and electronic document transfer that we know as the Internet. Included are also hundreds of lesser-known causal factors that range from environmental awareness to the institution of regulations to enable transparency within large public organizations.

The philosophy of risk and practical risk management co-exist as separate subjects, dealing with the same topoi but in different areas and with different concerns. From the research done within this paper, it becomes clear that the background of risk has in part influenced the terminology of the field. The terminology of risk has proved fruitful in transference to different disciplinary areas, and has raised a new set of disciplinary aspects to consider.

The creation of a graphical representation of the potential development of the history of risk - is relatively new to the discipline, with few precursors (Felix Kloman, 1999, Golding, 1992) and certainly no illustrative ones that also seek to encompass the social and philosophical angles of the topic. The work, however, can not be said to be over. As a *de facto* part of its nature, historiography does not end at a specific point: it continues to grow and develop as the field does. The enaction of the Sarbanes-Oxley Act (2001) created a new era in the history of risk management and records management, from where the repercussions may not yet have been documented. One future task will be to record these articles too, as a continuation of the history of risk management.

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Applying Project Management Concepts and Tools to Built Environment Research Projects

Paul Watson[1] *and Tim Howarth*[2]

ABSTRACT

This paper concerns the issue of Built Environment research students utilising a formal approach for designing and conducting research projects. The authors draw upon their experience of supervising and examining Built Environment research projects at undergraduate and postgraduate levels to critically reflect upon issues faced by researchers. Furthermore, student feedback has been obtained via semi formal interviews.

Within the paper a case is presented for research students in built environment disciplines to adopt and use Project Management concepts and tools in order to exercise better management control of research projects and increase the possibility of bringing the research to a successful conclusion. The works of Phillips and Pugh (2005), Rudestam and Newton (2001) and Delamont et al (1997) support the authors' observations and conclusions that research students would benefit from having a more formalised approach when conducting their research in order to better control and succeed in their research activities.

Keywords: Control Function, Loop Learning, Managing Research, Project Management.

1 *Built Environment Division, Sheffield Hallam University, Sheffield, S1 1WB*
E-mail: p.a.watson@shu.ac.uk

2 *Divison of Construction, School of the Built Environment, Northumbria University, Newcastle upon Tyne NE1 8ST*

1.0 INTRODUCTION

For many students the undertaking of a research project can be a daunting and demanding challenge. The authors propose that the approach to this challenge can be facilitated if students are able to perceive the task they face as being a 'project'. Promoting and highlighting the critical similarities between the management *characteristics* of research projects and the characteristics of 'project management' can help here. These similarities are considered to include:

- having a particular purpose which is not normally routine, or, by its nature, is unique;
- setting clearly defined start and end points, a time scale when the deliverables are required to be presented;
- an element of risk, because a project's unique nature touches upon the unknown;
- an element of managing peoples' perceptions and their respective expectations;
- complex activities involving communication issues.

With regard to the process of *undertaking* a project, both project management and a research project have the following in common:

- a set outcome and therefore they are objective orientated, e.g. for research it could the testing of a hypothesis;
- the purpose of creating/ascertaining something new, constructing a new structure or establishing new knowledge;
- the possibility of challenging convention/traditional ways of working or knowledge;
- an element of cross discipline working and/or collaboration;
- a requirement to manage peoples' expectations, these may be the clients or the researchers.

It can be seen that a research project can be considered to possess a number of commonalities with aspects of construction project management. A research project can also be considered to be subject to the same common threats as a construction project, such threats can include:

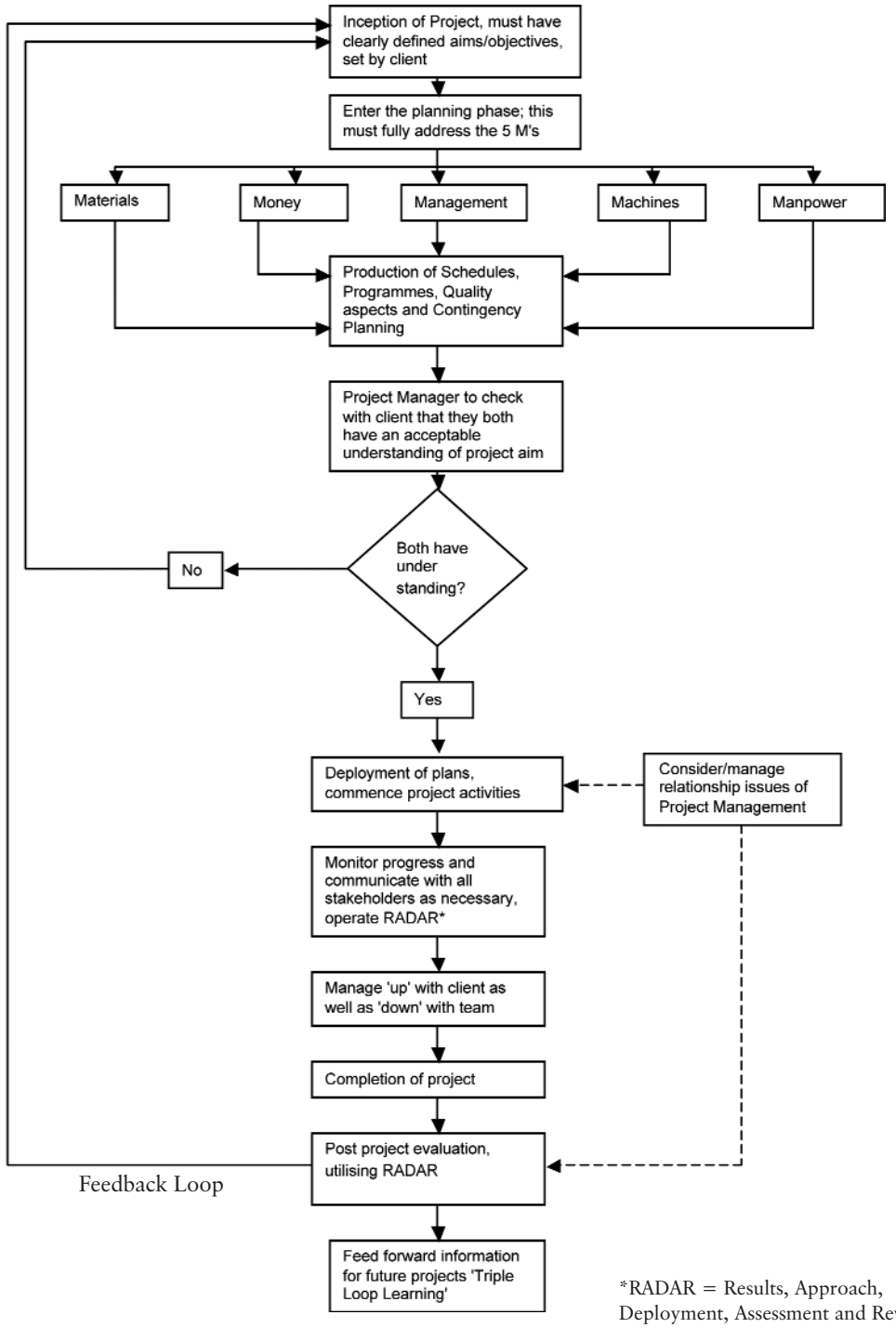
- poor planning and scheduling of activities and resources;
- over optimistic expectations, by client/researcher;
- a general lack of co-ordination throughout the project;
- a lack of management expertise, and application of management tools/techniques;
- unknown and unforeseen circumstances which occur before and during the project's life cycle.

Thus if the researcher can appreciate that a research project shares great similarities with project management, it becomes possible to address common problems and threats with the methodical application of project management concepts and tools.

Commonly both project management and research projects require a clear focus, As such it is essential to start with clearly defined and agreed objectives for a project, though these may be refined later. This point is corroborated by Rudestam and Newton (2001) who suggest that "...the prelude to conducting a dissertation study is presenting a dissertation proposal…. a research proposal is an action plan that justifies and describes the proposed study."

The setting of realistic deadlines should be conducted; these need to recognise that some delays are inevitable, so it is important for the researcher to employ the concept of 'flexible planning'. "Construct, in conjunction with your supervisor, an overall time plan of the stages of your research...this will enable you to locate your research in a [realistic] time frame" (Phillips and Pugh 2005).

In project management the aims and objectives have to be linked to the available resources allocated to the project and planning schedules produced. In the case of a research project this phase would be the



*RADAR = Results, Approach, Deployment, Assessment and Review. Covered later under 'Control'

Fig.1.0, Project Management Life Cycle Flow Diagram

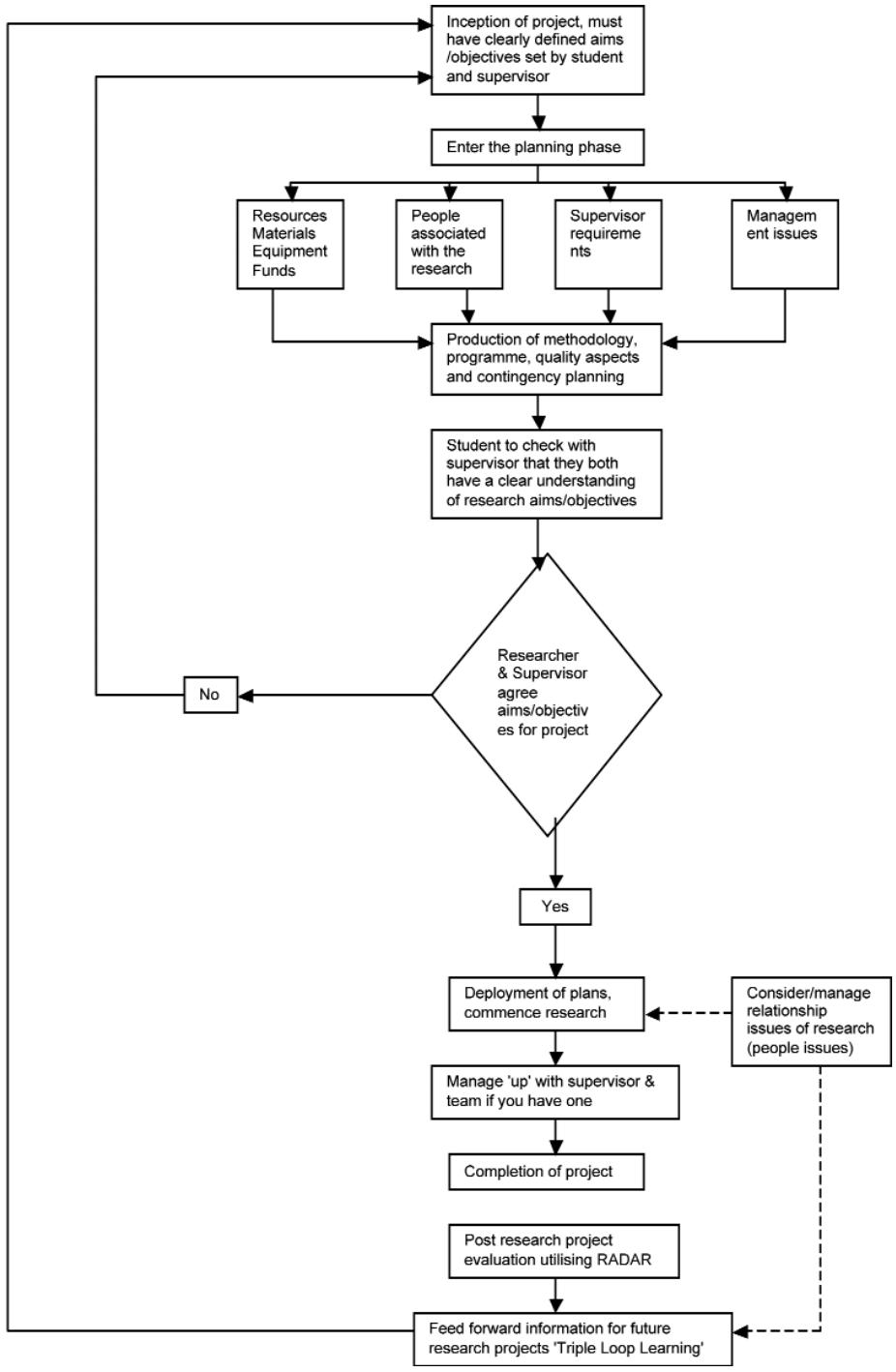


Fig.2.0, Research Project Management Flow Diagram

production "of the research methodology". Delamont *et al* (1997) advocate "...get [from students] an agreed research design, thesis plan and work schedule. These will need regular review [by the research team]". The researcher needs to take time to think through how the project will be 'managed', who will be involved and how to get them to 'engage' with the research. This is the same activity as a Project Manager when considering how they are to manage their team.

2.0 PROJECT LIFE CYCLE

Further to considering the approach to research projects both they and project managers can benefit from considering that the two have definitive 'project life cycles'.

A project life cycle consists of:

- Conception - the start of the research project, this may be an idea leading to the formulation of specific aims and objectives;
- Planning - thinking through and linking the critical phases/activities/ resources required for the successful completion of the project;
- Execution - the implementation phase of the research project, this will involve some re-planning and co-ordinating of activities (flexible planning);
- Closure - completion and writing up of the thesis, linking back to conceptions, aims and objectives.

Having a clear focus and agreed targets/objectives is an essential feature of project management, they are also critical features of a successful research project. Figure 1 presents the project management life cycle as a flow diagram. Figure 2 develops this flow diagram to illustrate the project management of a research project.

If a Built Environment researcher can understand the similarities between project management and managing a research project, they are more likely to avoid the pitfalls of not 'thinking through' all the necessary requirements for the attainment of a successful research project.

Researchers should also be aware that the suggested methodological approach should not be followed blindly. There are certain inherent dangers in application without thinking clearly of the desired outcomes. A researcher has to understand that when conducting research that the outcomes may not always be achievable and therefore an iterative process related to the advocated methodology has to be undertaken.

For example we often talk of triangulation of data analysis in determining the research output, but some times it is not triangulation but crystallisation that is the reality. In crystallisation there is an acceptance that there may not be a definitive end product and things just emerging from the process of investigation. So research success could in fact be the determination that a definitive end product is not possible due to the nature of the research task. However, under normal circumstances the methodology is a valid one.

3.0 RATIONALE FOR HAVING CLEAR RESEARCH AIMS AND OBJECTIVES WIYHIN A PROJECT MANAGEMENT FRAMEWORK

Commonly researchers are concerned with the achievement of aims and objectives within the context of constraints such as time and finances. A research plan can help with the considered allocation and the efficient and effective use of available resources. This plan may take the form of a research methodology, the plan being the method that needs to be deployed in order to achieve/complete the pre-determined aims and objectives. Researchers determine the broad lines of operation, the strategy or general programme, choose the appropriate methods, and sometimes the materials for the most effective and efficient actions. So planning relates to how, when and where research is to be carried out.

To be really effective, planning must be simple, flexible, balanced and based upon accurate information. Planning is an important tool for the researcher, requiring intense application and precise attention to

detail. As purported by Cryer (1997) "...as a research student you need to map out some sort of plan for your programme of work ahead...[the plan] can provide a sense of security in that where you are now and where you are going have been thought about and are documented...[the plan is] also something to display to a supervisor."

Having a plan is not an end in itself; the plan is only a starting point in trying to control the research project. A successful researcher has also to engage in the 'Control Function'. After all as noted by Cryer (1997) "Detailed plans inevitably need regular amendment".

The importance of having clear research aims and objectives (and possibly a hypothesis) as a starting point for research planning activity has already been advocated. The activity of undertaking to develop valid research aims and objectives can be modelled into a simple 'feedback loop'.

A key problem associated with conducting research as noted by the students contribution to this paper was in maintaining control of the project. Control cannot be a bolt-on activity it must be inherent form the initial conception of the project. This requires the researcher to be specific about their aims and objectives and this was not always understood by the students in their rush to make progress on their projects. However, even this is not sufficient, and the aims and objectives must be woven together into a holistic representation of the research project. Figure 3 presents a pictorial representation of a dynamic closed loop feedback model. This concept of control is one that is also employed when engaged in construction project management activities.

Control of a research project is exercised by the feedback and feed forward of information upon actual performance when compared with the pre-determined plan; therefore planning and control are very closely linked. Control is the activity which measures deviations from planned activities/objectives and further initiates effective and efficient corrective actions based upon a valid comparative analysis.

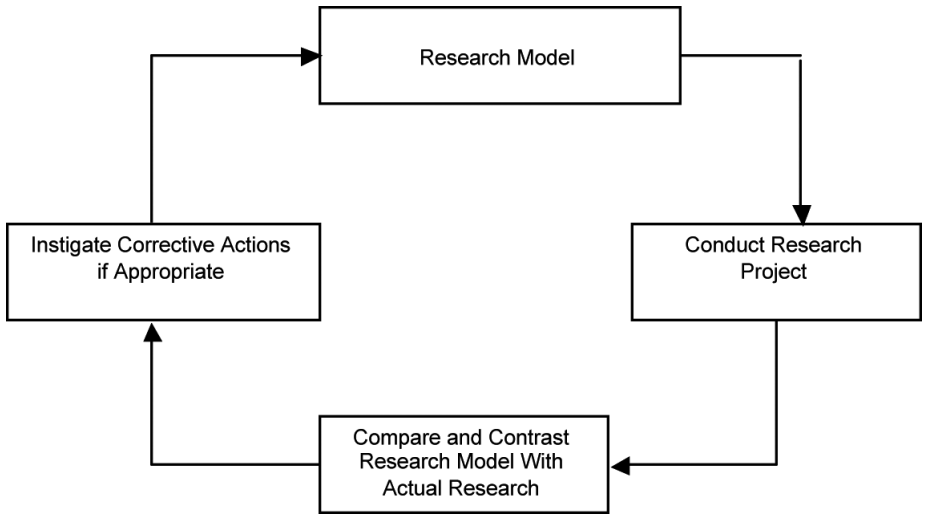


Fig.3.0, Dynamic Closed Loop Feedback Model

(Based upon the Deming Control Cycle as shown in Figure 5.)

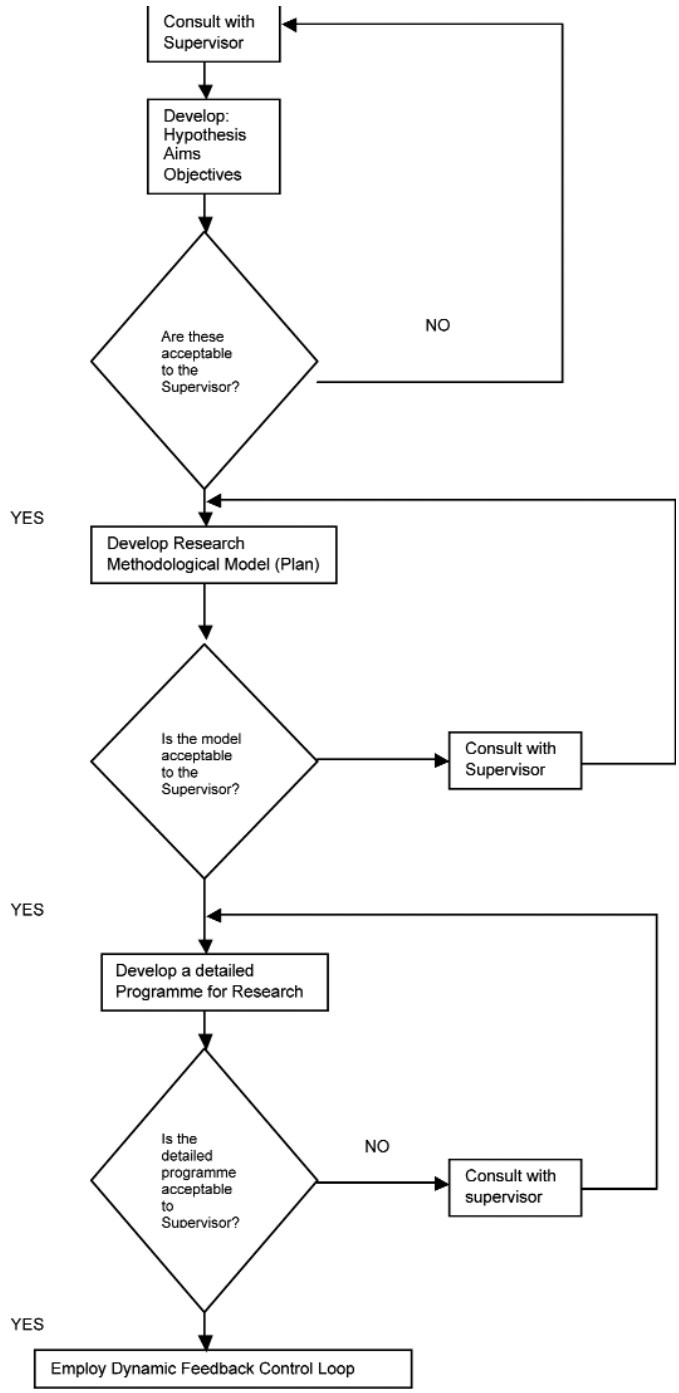


Fig4.0, Flow Diagram of Research Development

The use of the above model (figure 3.) can empower the researcher to monitor the progress of their research and if necessary instigate a corrective action procedure in order to ensure a successful outcome.

In applying the Dynamic Closed Loop Feedback Control mechanism a researcher must understand two important concepts; Cycle time and quality of information. Cycle time refers to the duration of time taken for the information to circulate around the loop. Cycle times must be as short as possible and the control mechanism should be applied at frequent appropriate intervals.

The second Concept relates to the 'Quality' of information circulating within the loop. Poor quality information circulating rapidly is of little value to the researcher. If the researcher has good quality information circulating rapidly and frequently, there can be efficient and effective control of the research project.

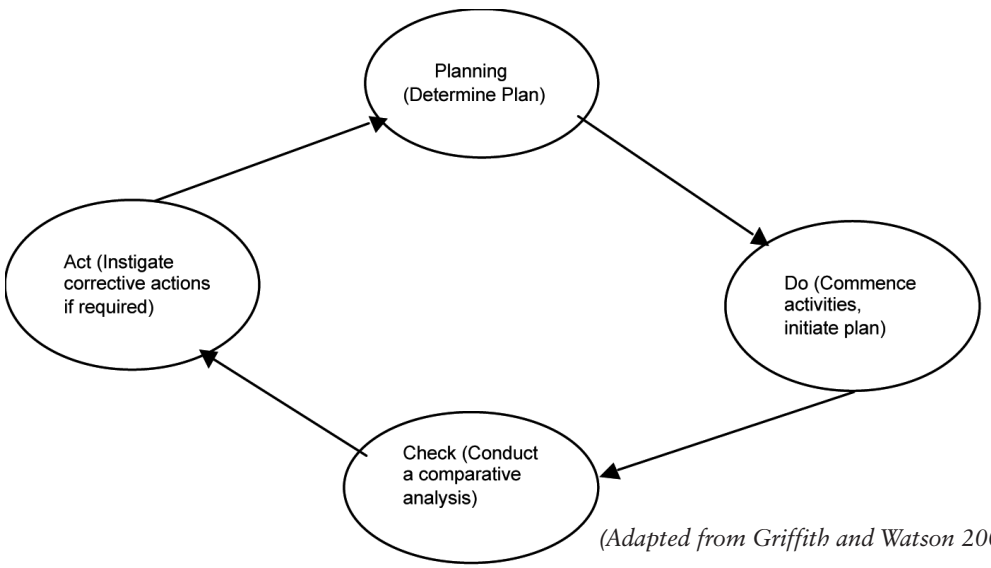
When undertaking to develop a planned and controlled research project with clear aims and objectives, effective communication between researcher and supervisor is necessary. Figure 4 provides a flow diagram of the research development process.

4.0 MAINTAINING CONTROL OF THE RESEARCH PROJECT

4.1 Control Cycles

Deming's concept of the 'Plan, Do, Check and Act (PDCA) control cycle' can be utilised to inform and define the control cycle of a research project. Figure 5 illustrates that PDCA is a continuous process that can be applied to any research or construction project. It involves establishing the project objectives and then determining the appropriate methods of reaching the set goals (Plan), implementing the Plan (Do), checking the effects of the implementation by comparing the actual results with the Plan (Check) and taking any appropriate corrective action (Act).

Phillips and Pugh (2005) state that: the student should plan "to monitor [your] overall progress, and thus motivate yourself to continue on course." The monitoring phase in a research project translates to being the check or comparative analysis aspect of the Plan, Do, Check and Act cycle.



(Adapted from Griffith and Watson 2004)

Fig5.0, Deming Dynamic Loop Control Cycle

4.2 Maintaining Control of the Project

In relation to a research project the PDCA approach involves the following:

- Plan: Identify needs and expectations, set strategic objectives, or research aims and objectives;
- Do: Deploy and operate processes, or commence research project activities;
- Check: Collect performance results and monitor and measure the processes, review and analyse, compare research results with research plan;
- Act: Continually improve processes and performance, based upon comparative analysis and if required instigate control functions.

The information contained within the control loop must:

- present results in a consistent, readily understood and useful manner,
- represent appropriate and valid time periods for instigating effective actions;
- be available in time for effective decisions to be taken;
- divert the minimum energies from primary functions, consider the 'Law of Diminishing Returns' and associated 'Opportunity Costs';
- clearly demonstrate the deviations from the pre-determined plan.

The application of the PDCA cycle to research projects can be further enhanced through use of 'continuous loop learning'. There are three types to consider: single-loop; double-loop; and triple-loop learning. It was evident from student feedback that they did not realise that control was also linked to learning from the experience and hence engaging with enhancement.

4.3 Single Loop Learning

Argyris and Schon (1974) developed the concept of single and double loop learning. Single loop is defined as when an organisation, team or individual responds to changes in their internal and external environment (or for example a deviation from a set plan) by detecting and correcting errors in order to maintain the central features of a plan and/or strategy.

In considering 'learning' Argyris (1996) cites Dahlgoard (2004) and suggests that errors are mismatches between the intention and what actually happens (the results). However, Argyris argues that discovering an error is not in itself learning and that learning only occurs when the discovery or insight is followed by action. From this view point, learning requires the taking of an action or actions. In this way incremental, imitative learning methods such as benchmarking and best practice are examples of single loop learning with learning decisions being based solely on observations. Critically Stata (1998) argues that learning has not really taken place until it has been reflected in changed behaviour, skills and attitudes. In recognising this, it is possible to enhance the single loop model (illustrated in figure 5) by introducing a 'thinking' phase' at the check stage of the process. The introduction of this thinking phase develops the model into double loop learning, as illustrated in figure 6.

4.4 Double Loop Learning

Here an organisation's, team's or individual's norms, policies, assumptions and past actions are critically examined in order to inform new learning (Argyris and Schon 1974). Inevitably, such actions involve 'thinking' about the deviations from the plan, and what actions should be taken and learning from the experience. Whilst in 'Single Loop Learning' people's decisions are based solely upon observations, when applying 'Double Loop Learning' decisions are based upon both 'observation' and 'thinking'.

4.5 Triple Loop Learning (as embedded in RADAR)

Triple Loop Learning incorporates a reflection phase to support or improve the thinking phase and improve the decision making process, and can lead to more efficient and effective actions being taken. Thus double and triple loop learning can be described as generatitive learning.

In order to employ the concept and practice of triple loop learning, a researcher must start with a prescribed plan or methodology and undertake to continually monitor such plans against actual progression and results and furthermore think and reflect upon any deviations before instigating actions. This should be done in consultation with a supervisor and will involve a process of "conflictual questioning". Engstrom (2001) notes that this is not a barrier to learning, but can lead to sharper and more focused questioning of results and possible resulting actions. One approach to engaging the researcher with triple loop learning is to apply and utilise RADAR.

4.6 Results, Approach, Deployment, Assessment and Review (RADAR)

At the heart of the European Foundation for Quality Management Excellence Model (EFQM, EM) lies a specific logic and this is known as RADAR. It consists of the following elements - Results, Approach, Deployment, Assessment and Review.

EFQM's RADAR model mechanism is related to Deming's continuous improvement philosophy of Plan, Do, Think and Act. Importantly, the RADAR process is driven by self-assessment. Thus the application of 'RADAR' and hence 'Triple Loop Learning' involves:

Determining the results that one is aiming for, in research terms this could be the testing of the hypothesis, completion of aims and objectives;

The next phase is to 'plan' and develop and integrated set of sound 'Approaches'. This would be the research methodology or plan, set to deliver the required 'Results';

The next phase is to 'Deploy' the approaches established during the 'Approaches' phase, i.e. the implementation of the methodology or plan;

The final phase that engages in triple loop learning is the 'Assessment and Review' phase. Here the researcher is assessing and reviewing the results obtained set against original 'Results'. This will be based upon monitoring and analysis of the results achieved and ongoing learning activities;

Finally, to identify, prioritise, plan and implement improvements where and when required.

RADAR can enable the researcher to establish whether the approaches used were appropriate for the attainment of the set results. It could well be that the approaches were not in fact the correct ones for achieving the set aims and objectives. Figure 6 provides a pictorial representation of the Plan, Do, Think and Act cycle linked to the Triple Loop Learning of RADAR. If the researcher employs the concept of RADAR they will have a systematic and controlled approach to the achievement of a successful outcome to their Built Environment research project.

4.7 Developing and managing the draft thesis

The application of triple-loop learning is beneficial to development and management of the draft thesis. The concept instils a mind-set of thinking, planning, monitoring, acting and reflecting throughout the whole process. Thus, it applies a personal dynamic approach to a creative activity where self-motivation and effort are significant resources in delivering a successful outcome. Although the researcher will be liaising with supervisors on an ongoing basis, the task of writing any piece of work is essentially an individual one and, for the most part, undertaken in isolation. The researcher therefore has to be self-reliant, developing a structure to the thesis which is individual yet within the academic and intellectual parameters set for the task. The ability to plan, act and reflect must become intrinsic to the researcher's approach and activities. The task of delivering the thesis from its conception to conclusion should be seen as 'a project' which, as stated earlier, must be actively managed. The first step in developing and managing the draft thesis is to create an 'outline structure' which will form the skeleton of the written work.

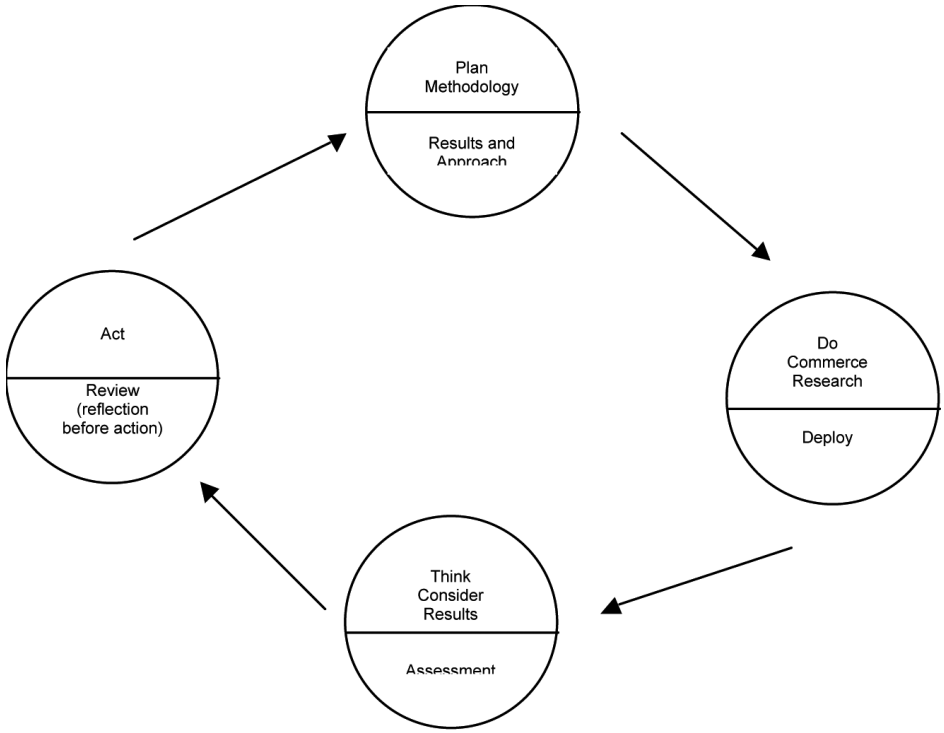


Fig 6.0, Matching of Plan, Do, Think and Act Cycle to RADAR

5.0 CONCLUSION

The process of managing a thesis is dynamic, self-led and involves the adoption of the 'triple-loop' learning process. This requires Built Environment researchers to engage in a continuous cycle of planning, doing, checking, thinking and acting. In this way, researchers are able to systematically decide on a required course of action, monitor their progress and motivate themselves to continue on course. Moreover, it helps Built Environment researchers to engage in the task of managing their thesis as a project, with clearly defined goals, resource use and outcomes. It is clear that the ability to develop and deliver a successful thesis can significantly benefit from the deployment of sound project management concepts and tools and Figure 2 provides a very useful flow diagram for guiding the researcher through the process.

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Is Today's Architecture About Real Space, Virtual Space, or What?

Emine Mine Thompson[1]

ABSTRACT

Nowadays digital technologies and information and telecommunication technologies are widely used in every aspect of our lives. This article focuses on the digital technologies and their effect on the place-making activities. First an overview of the digital technologies for the creation, occupancy and management of a building is given. Secondly, the concepts of space and virtual space are discussed. Through these discussions, the concept of places and its virtual alternatives and recombination the use of space are described. Finally some concluding remarks are made on whether today's place making activities about real space or it extends beyond that.

Keywords: Virtual Space, Real Space, Architecture in digital age, digital buildings

1 *Built Environment Visualisation Centre (BEVC), School of the Built Environment, Northumbria University, Ellison Building, Ellison Place, Newcastle upon Tyne NE1 8ST, UK.*
E-mail: emine.thompson@northumbria.ac.uk

1.0 INTRODUCTION

"…homes will be places with network addresses as well as street addresses. The function of the various interior spaces will be established, in large part, through installation of specialised information spigots and collectors…efficient delivery of bits to domestic spaces will, in addition, collapse many of the spatial and temporal separations of activities that we have long taken to granted. Many of our everyday tasks and pastimes will cease to attach themselves to particular spots and slots set aside for their performance and will henceforth be multiplexed and overlaid; we will find ourselves able to switch rapidly from one activity to the other while remaining in same place, so we will end up using that same place in many different ways" (Mitchell, 1995, p100).

Nowadays from the conception of an idea of a building through design, construction, management and duration of the occupation of that building; digital technologies are widely used. Involvement of the digital technologies in built environment has different levels. It can be said that it first started with using computers as drawing aids to now being able to create an "adaptive house"[2] that responds to its owner.

Traditionally a building can be descried as "*a usually roofed and walled structure built for permanent use*[3]*"*. However, with the influences of the digital technologies the understanding of the term 'building' as a shelter is altering dramatically. Buildings instead of having just a roof and walls to protect us from environmental effects and give us security and comfort, now need to accommodate HVAC systems, water supply and waste removal, electrical power and other energy systems, mechanical circulation systems, a wide range of safety and security systems etc. Information and communication technologies are affecting the way we design, build and use and re-use the buildings. The following table will try to classify the digital technologies that can be used during the life-cycle of a building. It should be recognised that the boundaries for the categories are fuzzy and the following table is just a framework.

Combinations of these technologies are making living spaces adaptable and interchangeable for their inhabitants. But how does this affect the overall space making activity? None of the great architects of history, neither Sinan, chief architect Sulemaniye Mosque in Istanbul, nor Michelangelo, architect of St Peter's Basilica in Rome, nor even Le Corbusier had such technologies available. We can only marvel at what they might have achieved today, when digital technologies are able to help architects to design complex structures more efficiently and effectively. Using technology as a "tool" gives a high quality final product that captures the architect's wildest dreams. However, with the ambiguous boundaries between real and virtual space in everyday life, what is today's architecture really about?

If architecture can be defined as "the art and science of designing structures and their surroundings in keeping with aesthetic, functional or other criteria, [and] architecture is now understood as encompassing the totality of the designed environment, including buildings, urban spaces and landscape" (Fleming, Honour, Pevsner, 1998) one might assume that architecture is about real space. However, information and telecommunication technologies are pushing the boundaries of real-space with digitally enhanced virtual space that is "accessible anywhere and located nowhere" (Riewoldt O., 1997).

But what really matters in the digital age? Is real space just a threshold for virtual space or does real space contain virtual space? Consequently, the movement in between the two spaces and the boundaries, which might be very vague, should also be considered in order to understand what today's place making is really about.

For the purpose of this paper since the built environment is the combination of buildings, landscapes and urban spaces, when architecture is mentioned one should consider all professional acts that create built environment.

2 *The Adaptive House, Please see http://www.cs.colorado.edu/%7Emozer/house/*

3 *MWOD_1*

Digital Technologies	Examples
Design	From basic CAD systems to BIM to VR etc., also electronic publishing.
Collaboration	Video conferencing, email, FTP technology, project collaboration websites/extranets, project collaboration solutions etc.
Structure	Responsive construction/facade, active control of traditionally passive elements such as glazing or wall thermal transmission, intelligent components, moveable walls, canals for power/data/voice cabling, flexibility and adaptability of components etc.
Services, energy efficiency	Automatic on/off sensor in the lighting system, electricity, water supply, High-tech, energy-efficient HVAC system, heating, cooling, Smart Metering Technologies etc.
Systems	Building Automation System (BAS), Energy Management System (EMS), Central Control and Monitoring System (CCMS), video, voice, data, irrigation, etc
Management	Maintenance, cleaning, leasing, computerized/interactive building directory etc.
Security, safety, access control	Reduced manpower dependence, CCTV, card access control, smoke detection, intrusion alarms, emergency control of elevators, doors, earthquake sensors, flood detection etc.
Telecommunications (working from home etc)	Fiber-optics capability, built-in wiring for Internet access, Wiring for high-speed networks, LAN and WAN connectivity, Satellite accessibility, ISDN, etc.
Entertainment	TV, theatre systems, video projectors/screens, video wall etc.

Table 1.0 Digital Technologies for buildings-From the design to occupancy[4]

2.0 UNDERSTANDING SPACE IN ORDER TO UNDERSTAND VIRTUAL SPACE

Madanipour (1996) explains that "The search for a meaning of a space is a necessary step to take, as it is crucial before moving into the normative realm of design…" If one can try to find out in which ways the virtual space is different from real space then shaping it and giving it a meaning with design activities might become easier. When it comes to define "space" in order to define "real space", it seems these two concepts are knitted together. "Space" is defined eighteen different ways in *Cassell's Dictionary and Thesaurus* (1999), all different entries are dependent upon where the word "space" used for, such as in mathematics, astronomy, music, printing etc. Defining "real space" depends upon what we, as place-makers, really understand from space. Furthermore, in many other definitions, "space" is simply explained as three-dimensional volume or an empty place which is synonymous with a room.

The nature of physical or real space is something which philosophers and physicists have debated for centuries. These are two main ideas about space. One is the idea of "absolute space" i.e. space as sort of a container, the other is the idea of "relational space" i.e. space is just a matter of relationship between

4 *This table is generated from several sources mentioned at the Reference section of this paper.*

objects and there is no container. Things get even more complicated when we consider ideas like Einstein's space-time or that space is some how socially produced (Madanipour, 1996). However Riewoldt (1997) argues, "digital technologies can add a new dimension to architecture, but they cannot redefine its fundamental character. For architecture, utopia will continue to lie in the real world, not the virtual realm".

2.1 Differences between real space and virtual space

– Movement versus non-psychical movement

For the purpose of this article, the author is using an idea of physical space that is close to the common-sense idea of space, i.e. space which our bodies move through. Virtual space in this sense is different because our bodies do not move through it. Mitchell (1995) points out that "the net is fundamentally and profoundly *antispatial*… You cannot say where it is or describe its memorable shape and proportions or tell a stranger how to get there…It is ambient — nowhere in particular but everywhere at once. You do not go to it; you log in from wherever you physically happen to be." Mitchell claims that we can not really get hold of virtual space in the same sense we can real space.

The "movement" in virtual/cyber space has a completely different meaning. "You get from place to place in cyberspace by following logical links rather than physical paths" (Mitchell, 1995). However, you are not physically moving, therefore you might be jumping from continent to continent while you are surfing on the Net but actually, you are at your comfortable, warm, sheltered room somewhere in the world. Accordingly, one can argue that without the comfort, warmth and shelter of a designed and physically constructed place – a real place – your chance to be able to move in the virtual space is almost impossible.

– Experience versus digital experience

Digital experience occurs in cyberspace. Cyberspace can be describes as a non-physical environment shaped by computer technology or an "infinite artificial world where humans navigate in information-based space" (Benedikt, 1991). Cyberspace as Gu and Maher (2007) explain "distinguishes itself from other networked technologies by having place characteristics". Concisely, it can be said that virtual space is a place where some human activates can take place on digital level rather than at the level of pure bodily experience.

With the use of digital technologies, sense of place – *Genius loci*[5] – of a building is rapidly changing, "we have our favourite spots and they mean great deal to us" (Horan T, 2000). Without these favourite physical spaces, one's sense of identity and belonging to a "place" becomes ambiguous. So therefore how a virtual place, which would be accessible from anywhere in the world therefore should have some cultural clues to the people who are visiting, can be created successfully?

"Places in the cyberspace of the Net are software constructions. Each piece of software running anywhere – on any machine or collection of machines in the Net- creates environments for interaction, virtual realms that you can potentially enter. The text window provided by a word processor is one such place... Like architectural and urban places, these have characteristic appearances, and the interactions that unfold within them are controlled (often very rigidly) by local rules" (Mitchell, 1995). The experiences we have in cyberspace are electronically enhanced and programmed by somebody, therefore controlled –not like the real life experiences which you might encounter.

Although at some levels, the digital experiences you have might feel real, but actually they are not real in the physical sense. Therefore, one might claim that without the experiences that take place in the "real places" the "sense of place" feeling might not be cultivated effectively during digital experiences.

5 *Genius Loci*…the genius of a place could be divined by paying attention to its individual features *(Thompson I H, 2003).*

3.0 REAL SPACE AND VIRTUAL SPACE IN ARCHITECTURE

From the beginning of history, place-making activities served to accommodate the needs of human beings. While over the centuries achievements and developments in technology have continuously given "the new" to the societies, place-makers needed to deal with the challenges that these achievements brought. The effects of these developments are shaping the buildings and the environment. "Not so long ago, when the world seemed simpler, buildings corresponded one-to-one with institutions and rendered those institutions visible. Architecture played an indispensable representational role by providing occupations, organisations, and social grouping with their public faces…Buildings were distinguished from one another by their differing uses, and the inventory of those uses represented social division and structure" (Mitchell W, 1995).

As the human activities start taking place in both real and virtual spaces buildings or their representational characteristics according to their usage are not that distinguishable anymore. "Once, we had to go to places to do things; we went to work, we went to home, we went to theatre, we went to conferences, we went to the local bar — and sometimes we just went out" (Mitchell W, 1999). Digital technologies are allowing us to access various services and settings with a touch of a button. A dwelling can physically look like a house however can continuously change its secondary function to a workplace, to an entertainment place to a shop without going through any structural change. This paradigm encapsulates the real and virtual space.

"Telecommunications support new electronic spaces but only in the physical space where the right infrastructure is built and can be accessed" (Graham S, Marvin S 1996). Mitchell (1995) also explains the similarities and differences between real buildings and their ever-developing virtual twins.

Table 2.0 shows the duality of the space concept by presenting real and corresponding virtual spaces.

Real Space	**The virtual twin**
Façade	Interface
Bookstores	Bitstores
Stacks	Servers
Galleries	Virtual Museums
Theatres	Entertainment Infrastructures
School houses	Virtual Campus
Hospitals	Telemedicine
Prisons	Electronic supervision programmes
Banking Chambers	ATMs
Trading floors	Electronic Trading Systems
Department stores	Electronic Shopping Malls

Table 2.0 Real space and its virtual twin (Created from Mitchell 1995)

Buildings defined specific usages in the olden ages; having a virtual twin for a building or a function gives wider opportunities for that use. This allows us to do most of the things in an electronically fully equipped space with a click of a mouse.

3.1 Recombination

Architecture, or in general place-making activity, is about space. Space, in the design-making sense, holds real space and virtual space together. Without having a protected, defined and designed "real space", it is almost impossible to be in the virtual space.

The combination of real and virtual space should able to accommodate the ever-changing human needs and activities, providing that the place makers will be adjusting, discovering and re-discovering their creative ways. "Bruno Latour's point about space and time being constructed within networks through which the world becomes recombined" (Graham S, Marvin S, 1996) indicates that architecture is now about combining real and virtual space. Amalgamation of different elements including tradition, culture, technology, and design ability are still the fundamental elements for place-makers; however, these fundamental elements can be enhanced by using current technology effectively.

Mitchell (2003) points out that the very nature of twentieth-century modernism was to distinguish and separate the functions and announce those functions visually. "But the architecture of the twenty-first century can be far less about responding to such rigid programmes and much more about creating flexible, diverse, humane habitats for electronically supported nomadic occupation" (Mitchell, 2003) . Rather than having to settle with one function for one building; with this new, nomadic style, buildings with their automated functions, fast and adaptable telecommunication systems, and timesaving services creates flexible living spaces to their inhabitants. "As architects are rapidly discovering, this breaks down rigid functional distinctions among specialized spaces, and makes provision for varied and sometimes unpredictable functions increasingly critical; a home must serve as an occasional workplace, a hotel room must also be an office, a café must accommodate laptops and a work place must adapt to more complex and dynamic patterns of use" (Mitchell, 2003). Therefore the main tasks for the place-makers are first to comprehend the nature of this paradigm shift and then to accommodate this in their designs.

Since "the classical unities of architectural space and experience have shattered architects now need to design for this new condition" (Mitchell W, 1995). This new condition gives the prospect to embed the opportunities and services which would provide virtual space in real space. Doing this might be easier with brand new designs. Since a different level of requirements has been added to the list, incorporation of these new necessities in older buildings is getting increasingly harder. The concept of recombinant design focuses attention on how digital technology can be incorporated into this complicated yet important place-making process" (Horan T, 2000).

"Recombinant Architecture" as Mitchell (1995) and Horan (2000) broadly explain, can be an answer for this challenging digital age where a balance between digitally fully equipped study and an "unplugged" quiet room in a house should be established; and similarly diverse informal work places should provide both wireless networks for flexible digital use and spaces that allow traditional face-to-face interactions.

Because the movement between physical space and virtual space is now an everyday act one can say that the significant element in the recombination is to give options to the users freely to move between real and virtual space. Mitchell (1999) points out, "we [as place-makers] must extend the definitions of architecture and urban design to encompass virtual places as well as physical ones, software as well as hardware, and interconnection by means of telecommunications links as well as by physical adjacencies and transportation systems. As we must recognize that the fundamental web relationships among houses, workplaces, and sources of everyday supplies and services — the essential bonds that hold cities together — may now be formed in new and unorthodox ways".

4.0 FINAL THOUGHTS

One should consider that cyberspace/virtual space is a new addition to real space. It gives new opportunities for improving and understanding the physical space we live in. It challenges the designs in order to combine new aspects to physical space that one can have diverse encounters in virtual space while just being in that physical space.

To be able to achieve this new understanding of the real space the relationship between the parties (architect, the client, project manager and others) involved in place-making activities and the skills those parties require needs to be redefined, the traditional design-build-operate framework needs to be challenged and, since designing and building is becoming a data-based activity, the information needs to be shared and collaborated effectively.

It can be said that virtual space is not a threat to physical space; it can only be a big enhancement to real space. As long as both spaces perform together and complement one another in order to accommodate human activities, this multi levelled space can only be an improved environment. Architecture in 21st century is actually about real space that provides users with the ability to exist in virtual space. The sizes of either of them are irrelevant. In some different scenarios, either of them can be bigger than the other, yet nevertheless real space would have the virtual space within it—at least for the timebeing!

5.0 ACKNOWLEDGMENT

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The Changing Entrepreneurial Nature of the Educational Organisations – Some Thoughts

Michael Eich[1], *Carsten Harth*[2], *Thomas Heyn*[3] *and Udechukwu Ojiako*[4]

ABSTRACT

Change within organisations is about ensuring the control of external and internal change variables that affect organisational effectiveness.

This paper briefly evaluates the key variables of change in organisations and its management. The perspectives form the basis of a brief review of strategic organisational change within a UK university. The intention of the authors is to use these contemporary theoretical concepts to examine how a university has adopted an entrepreneurial approach to sustainable growth within an environment of constant change.

Keywords: Change Management; Entrepreneurship, Higher Education

1 *TUV SUD ImmoWert GmbH, Berlin- Germany, E-mail: michael.eich@tuev-sued.de*

2,3 and 4 *Division of Project Management, Northumbria University, Newcastle upon Tyne NE18ST. E-mail: udechukwu.ojiako@northumbria.ac.uk*

1.0 INTRODUCTION

A feature of today's management literature is the constant growing emphasis on organisational change, which argues that organisations must change in order to survive. Popular management literature (Voropajev, 1998; Bresnen et al, 2005) shows how managers are being pushed to transform their organisations from bureaucratic, hierarchical structures to flatter, more flexible structures based on project teams. There is however much evidence (Bresnen et al, 2005), which suggests that a large-scale organisational change can stretch management skills.

Institutions of higher education in the UK have undergone massive transformation over the last two decades. The change has taken place due to a decline in public funding, increase in global market demands, competition, and technological advancement. These changes (in the operational environment of UK higher institutions), has led to a demand for these organisations to become self-sustaining. This is particularly important in an increasingly competitive and expanding international education market (Parker 2002). Due to the need to adapt to the ever increasing competitive nature of the industry, learning has become a demand-driven business activity with the role of academics becoming ever more entrepreneurial as they are forced to deal with a continuously expanding, and more diverse and demanding student population. To meet these challenges, universities are increasingly enhancing their entrepreneurial capabilities (Malhan, 2006) through various strategies which include engaging in more external partnerships with other educational and industry establishments, aggressive recruitment of foreign fee paying students and the increase in the use of new technology.

The new entrepreneurial environment higher education institutions are now operating is global, multidisciplinary and highly competitive. It also involves an evolution of new operational and structural configurations to be established with the organisation while at the same time relationships between and among nations, peoples, cultures, philosophies, values and governments (Jackson 2004), is also enhanced.

It is also important to note that in order to enhance their entrepreneurial operations, there is also a need to pursue new approaches to governance, management and educational leadership. Compared to other universities, the post 1992 universities have peculiar characteristics which may cause problems adapting to the changing nature of the UK education industry. According to Sporn (1999) these problems arise from the variety of interest groups influencing decision making, the dual control system of faculty and administration, and the definition of leadership roles within these two conflicting schools of thought (i.e. faculty and administration). Consequently, in order to be successful, the implementation of change within the post 1992 universities requires the consideration of certain variables which this short paper intends to explore.

2.0 STUDY OBJECTIVES

This paper focuses on variables impacting on the implementation of change in a post 1992 UK university (Northumbria University). The university at present has implemented an aggressive growth strategy in order to increase its international student recruitment, grow its overseas franchises and expand its distance learning provision. To explore these strategies, key strategic factors are identified and evaluated would need to be considered in order to support the successfully implement change.

In order to support our study, we chose as a methodology the use of practice-oriented case study which has been successfully used in similar studies completed by Maguire and Ojiako (2007; 2008) and Ojiako and Maguire (2008).

3.0 BACKGROUND TO UK HIGHER EDUCATION

The Higher Education system of the UK takes place in a wide variety of institutions. The three main types are universities, Higher Education colleges and further education colleges. Higher Education courses are generally above the standard of A-levels or National Vocational Qualification Level 3. They include

foundation and first-degree courses, postgraduate courses and Higher National Diplomas and Certificates.

Until 1992, there were two kinds of Higher Education providers in the UK, the Universities and the Polytechnics. The Polytechnics were tertiary education teaching institutions in England, Wales and Northern Ireland. Although polytechnics doe have enviable achievements (Table 1.0, below), they were generally 'owned', by local authorities and more oriented towards teaching more vocational oriented courses.

Table 1.0, Implications- Accomplishments of the Polytechnics before and after 1992

Variable	**Achievement**
Breath of Provision	Educated and still educate more than 80 percent of the "mature students".
Flexibility of Provision	Pioneered part-time and "sandwich" courses, where students alternate jobs and do academic work by being first to introduced American-style modular degrees.
Provision of opportunities to minority groups	Provided new opportunities for women, members of minority groups and people without the secondary school diplomas needed to enter some of the traditional universities.
Community involvement	Closeness to communities and the strong links to the industry, enabling students to get hands-on experience.

By 1992, the government recognised that the difference between Polytechnics and Universities had become confusing. There were also financial pressures as part of the governments overall market-oriented reforms cantered around ceasing funding of polytechnics (through local government authorities), due to the changing economic situation within the country. The result was to allow Polytechnics to change their status (if they wished) and become Universities. The Act also provided for the creation of the bodies to fund Higher Education in England (HEFCE) and further education (FEFC) in Scotland and Wales.

The effect has been that as majority if not all former UK Polytechnics transformed to become universities. This transformation has also meant that these institutions ended up loosing their traditional sources of funding from local authorities.

Academic degrees awarded through the Polytechnics between 1965 and 1992 were validated by the Council for National Academic Awards (CNAA). This organisation was chartered by the government to validate and award degrees and to maintain quality standards throughout the country. A CNAA validated degree was generally considered to be equivalent to a university degree.

4.0 OVERSIGHT AND QUALITY-IMPLICATIONS OF FUNDING CHANGES

Although subject to rigorous oversight by the CNAA, polytechnics were sometimes perceived as ranking below universities in the provision of quality Higher Education due to their lack of independent degree-awarding powers. They were also not research oriented. Funding was through the local authorities who had sole responsibility to determine overall strategic direction of the polytechnics. The effect was that there was no need for enterprise within the former polytechnics as they did not need to bid for funding from the various research councils. One of the impacts of these changes is that as Polytechnics have gained university status, they have had to struggle with changes in funding and the need for a more entrepreneurial outlook to income generation. In order to cope with the loss of their traditional sources of funding from local education authorities , most former polytechnics have come to depend (perhaps too much), on student (esecially foreign) fees as the main source of their income.

5.0 THE CONTEXT OF ENTREPRENEURIAL CHANGE AT NORTHUMBRIA UNIVERSITY

The current strategic change project began in 2002, following student applications declining year by year over a five year period. At the same time, during this period, the organisation went into a financial deficit of 4%. An audit by the governors of the university determined a multitude of problems that needed addressing. In response, a change programme was initiated by the university commencing with the re-branding and restructuring of the university. This was followed by the establishment of a new vision, mission and strategy (Fidler, K. 2006). The strategic scope was set to 10 years and included plans to increase student numbers (national and international) and turn the financial situation around.

Table 2.0, Growth Targets

Targets	Finance Health	Costumer Satisfaction	Reputation
Steady Growth of ~2% above inflation	X		
Maintain target 6% surplus	X		
Manage staff cost to ~58% of income	X		
Develop high quality student market ~1.5% p.a.	X		
Diversity of income sources	X		
Reducing bureaucracy and time spent in committees	X	X	
Maintain overseas and EU student numbers	X		X
Improve Quality of our offer		X	X
Maintain and improve conditions for students, student centred services and support		X	X
Maintain and improve facilities		X	X
Commitment to research	X		X
Development of students and staff		X	X
Further Campus estate development		X	X

The following above table 2.0 (above), demonstrates the growth targets identified by the university as part of its re-structure programme in 2002.

6.0 SITUATIONAL VARIABLES AND INTERVENTION

Situational variables which have been previously explored in studies by Yerbury (2005), Williamson (2006) can affect the choice of a change implementation strategy. Successful change strategies are those that are internally consistent and compatible with key situational variables (Kotter and Schlesinger 1979).

In their earlier studies, Yerbury (2005), Williamson (2006) identified dominant variables which confront complex organisations such as universities that are looking to change. These variables include clients, systems and technology, scholarly communication process, learning environment and the challenge of the academic profession response to change.

Interventions available during the change implementation may focus e.g. on people and the processes through which they accomplish organisational goals (Cummings and Worley 2001). There is nor easy formula to identify the most effective intervention. There are also factors that can influence the sequencing of interventions, such as the purpose of the change, the organisational politics, their impact on the support for different interventions, the need for an early success to maintain motivation, the stakes involved and the causal links that affect the dynamics of the change.

7.0 CHALLENGES AND THE IMPLEMENTATION OF CHANGE-THE CASE STUDY

Northumbria University with deep roots in the North East region of England has its beginnings in three regional colleges: Rutherford College of Technology, the College of Art and Industrial Design, and the Municipal College of Commerce. These three collages where amalgamated in 1969 to form Newcastle Polytechnic. In 1974, the City College of Education and 1976 the Northern Counties College of Education where also incorporated into the Newcastle Polytechnic. Newcastle Polytechnic was transformed into the University of Northumbria at Newcastle in 1992 (which became possible under the Further and Higher Education Act 1992). In 2002, the trading name of the university was simplified to Northumbria University. About 29,500 students are currently studying at Northumbria University (Fidler, K. 2006), across a wide range of full-time, part-time, Distance Learning (DL) and short courses. The university runs a largely modularised curriculum. Of its 29, 500 students, about 16,000 are full-time students primarily funded through the Higher Education Funding Council for England (HEFCE). The University's academic structure includes 11 subject areas in 11 Schools including a Graduate School. In addition to teaching activities the university offers business services like consultancy, applied research, project management, special courses, and e-business support. These services are mainly provided through the Northumbria Commercial Enterprises (the University's entrepreneurial unit).

In order to achieve desired strategic goals, we explore the situational variables that are likely to influence the change implementation process within the university. These variables which are to be discussed in more detail includes:-

- Growth Strategy
- Entrepreneurial Activities
- Sustained teaching quality within the context of globalisation
- The student as a customer

7.1 Growth Strategy

Although overall student numbers are rising, competition for students by UK universities are increasingly getting fiercer due to an expanding number of universities exploiting technology to attain a global reach. These universities such as the University of South Africa (UNISA) with over 200,000 students world-wide and the Allama Iqbal Open University (with over a million students world-wide), are increasingly in competition with the university for the declining home student and also for the well sought after foreign fee paying student. For this reason, to survive and also achieve its mission statement, the university is emphasising the generation of income as part of its growth strategy. The need to generate income has also resulted in the university withdrawing courses and programmes that have struggled to recruit and retain students. The university has also re-emphasised its commitment to excellent teaching which is supported by applied research which informs teaching.

Overall, although this strategy clearly has attainable benefits, there are also quality related problems. These concerns will continue to linger if it is perceived that provision of courses and programmes are solely *student-led*, i.e. determined by popularity with students.

7.2 Entrepreneurial Activities

Another approach the university has adopted in order to grow its operations has been to increase its entrepreneurial activities. The university at present already provides several business services, one being the Northumbria Commercial Enterprises (NCE), which is set to enhance and promote entrepreneurship within primarily in the North-East of England.

7.3 Sustained teaching quality within the context of globalisation

Most of the proposed changes within programme provision at the university could be impacted by the internationalisation of the university. The internationalisation of the university is expected to continue to generate a wider identity debate, especially along the lines of whether the university intends to remain an institution focused on providing a British education to an international body of students, or whether the university intends to be perceived as an institution located in the UK, providing educational products and services to an international student body. Whatever direction the university decides to choose, there are factors that need to be taken into consideration. In the first place, the culture of the institution will continue to change (although the impact on the overall student experience is yet to be determined), as academic and teaching staff increasingly deal with a large (and sometimes majority) class mix of international students. Secondly, these changes are also accompanied by increased administrative, pedagogical and support requirements. According to Jackson (2004), the most likely resultant consequence is that these challenges will drive the transformation of the traditional academic into an educational consultant.

7.4 The student as a customer

Another major debate that has arisen from the loss of traditional funding sources for the post 1992 universities, has been the debate on the position of the student within the overall education supply chain.

What we have at present is the concept of the student as a customer, which to some extent is being advocated by some academics, although reports of a fight back against this concept have been intense, especially during the 2007 British Academy of Management conference.

As part of our contribution to this debate, we feel that this notion is misconceived if one considers a simply supply chain. From this perspective, it rather becomes clear that the student remains a product with potential employers (who ultimately hire graduating students remaining as the customer). We however recognise that there are some difficulties with all sides of the argument. Precisely, for the argument against, there must be a realisation that although we can from the overall supply chain place students as products, the difficulty is dealing with this 'products', it that the product actually plays a major role in determining where they are to be 'sold'. The reality is that students ultimately determine what university, course and programme they want to undertake. They also determine to some extent (at least the students graduating with good scores or from well sought after programmes), determine what companies, where and when to apply to for work. From this perspective, we see the idea of the student as a customer as a perhaps difficult concept that academia will need to address especially as universities are having to end up balancing the notion of quality with a clear knowledge that in a customer driven educational market, a university that generates a reputation as 'hard' will struggle to recruit and retain students (who are now almost all fee- paying).

8.0 DISCUSSION

What we have attempted to demonstrate in this short reflective paper is that the criteria for organisational effectiveness is determined by various parameters and variables which includes the purpose of the organisation, stakeholder perspective and benchmark standards.

The case study to some extent has re-emphasised the distinction between goal and systems perspectives with the goals perspective presenting organisations as rationally constructed entities in the quest for certain identifiable goals, while system perspectives focuses on the functional complementary of parts of the organisation (Goodman and Penning 1980).

Furthermore the o*pen system theory* regards organisations as composed of a number of interrelated sub-systems that are 'open' to their external environment as well as 'open' to each other and analyses them in a holistic perspective. These sub-systems are defined by strategic orientation, technologies, organisational structure, and human relations and culture. The management's task is to establish links between them and the environment in order to facilitate change (Miller 1967).

Ultimately, based on our appreciation of open systems theory, we have further demonstrated that the university or parts of it can not be described as isolated organisational system. For this reason, exploring organisational change at a university therefore needs understanding the university's organisation as well as its values and culture.

9.0 CONCLUSIONS

This short paper intended to review variables that have been considered as part of the university's overall change process of the University. In summary, what emerges is that theories of organisational development change management are intricate and interwoven. The theoretical foundations of change management are also shown as extensive, although of an individual nature in interpretation and approach. What is more, the implementation process of change does not appear a distinct discipline, nor does it necessarily have clearly defined boundaries. Rather, change is a discipline which draws on a number of social science disciplines and traditions (Burnes, 1996).

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Curriculum Development Practice

Dom Fearon[1]

ABSTRACT

This paper discusses the subject of curriculum development. More specifically the paper discusses involvement with curriculum development in teaching and adopts a reflective writing style.

Keywords: built environment, curriculum management, education, quality assurance, reflective.

1 *Property and Real Estate Division, School of the Built Environment, Northumbria University, Ellison Building, Newcastle upon Tyne NE1 8ST*

E-mail: dom.fearon@northumbria.ac.uk

1.0 INTRODUCTION

Since starting a career in lecturing at the School of the Built Environment a year ago, I have been involved in the teaching of a variety of modules at all levels. For the purpose of this paper, I have chosen a module entitled Career and Business Development (BE0871), which I have been teaching on this year as my focus of reflection.

The paper will first look at my role in module development together with the background and rationale for this particular module within the degree programme. I will then focus on the key areas. This enables me to conduct a critical analysis on how they have influenced the nature of curriculum development. A larger proportion of the report will concentrate on the second subject being 'curriculum management'.

1. Curriculum Development
2. Managing a Curriculum
3. Quality Assurance

The module Career & Business Development is a core subject at Level 5 taken by Year 2 students on the Estate Management and Planning & Surveying degree programmes. It is designed to allow students to reflect on their career aspirations and current skill levels ahead of taking an optional placement year in industry. It helps students to identify the skills required by employers and seeks to develop these transferable and business skills. It provides a job search strategy and includes C.V's and application forms, selection processes and interviews. The module also covers professional ethics and codes of conduct in the workplace as required by the Royal Institution of Chartered Surveyors.

The rationale for the module lies partly with the requirements of the RICS. In addition, there is a need to ensure that students are able to meet the needs of local and national employers for placement purposes. As I have recently made the transition from industry, I was asked to provide a teaching input on this module.

2.0 CURRICULUM DEVELOPMENT

Before further discussion on the topic it would be useful to define 'What is Curriculum ?'. The definition is not straightforward and many writers have their own definition of *curriculum* with various meanings and connotations which can be confusing. I have chosen two examples which, in my opinion, provide a clear and concise definition which I can happily understand.

'A curriculum is an attempt to communicate the essential principles and features of an educational proposal in such a form that it is open to critical scrutiny and capable of effective translation into practice.' Tanner & Tanner (1975)

More recently

Curriculum is the totality of learning experiences provided to students so that they can attain general skills and knowledge at a variety of learning sites.' Marsh, C. J (2004)

With these definitions in mind it is important to consider the following aims in developing a curriculum. In the first place, a curriculum should meet the needs, aspirations and personal growth of an individual i.e social and economic(the workplace) needs. This will be discussed further below. Secondly, a curriculum should encourage the student to develop themselves through 'independent learning' to find their own interest in the subject. This should be in addition to the key skills and knowledge we teach them but does rely on the students own self-motivation. On the Career & Business Development module this approach is specifically instilled on the students who must prepare job applications and approach employers themselves.

Many factors influence the nature of curriculum development and I have set out below the following for further consideration.

- Individual influences
- Institutional/Professional influences
- Educational influences
- Social influences

2.1 Individual Influences

This involves the impact on the individual i.e the student. It is important that they can see a clear 'pathway' for themselves in the way of personal development with an achievable result which, in this module, would be confidence in a business/workplace environment. They would also feel better equipped with good skills and knowledge required for placement or post education.

When developing a curriculum we also need to consider that some students will unfortunately take a surface approach to learning. The surface approach arises from an intention to get the task out of the way with minimum trouble while appearing to meet course requirements. This issue needs to be addressed at the outset of curriculum development. According to Biggs, J (2003) common factors of such an approach include:

- An intention only to achieve a minimal pass.
- Non-academic priorities exceeding academic ones.
- Misunderstanding requirements, such as thinking that factual recall is adequate.
- A genuine inability to understand particular content at a deep level.

2.2 Institutional/Professional Influences

There is, understandably a large influence on the curriculum by the professions. This is partly due the university's heritage as a former Polytechnic but also with an emphasis on industry and the successful partnership with the industry professional bodies (e.g.RICS and RIBA). This relationship functions well with the university working with rather than for the professional body. It ensures the university (and the curriculum it delivers) can keep it's 'finger on the pulse' of the surveying profession.

From the students point of view it is also beneficial as they can see and mix with RICS staff and local members who often contribute by way of guest lectures, providing student prizes and supporting school and social events.

2.3 Educational Influences

Our curriculum within the School of the Built Environment is largely profession-based with much emphasis still based on traditional drawing, surveying and measurement skills. This is also true of this particular module which aims to equip students with the personal and professional skills required in the workplace. This professional aspect together with the close collaboration with the industry body as mentioned above means teaching staff are often seen as 'instructors' in a training role as well as 'academics' in an educational role.

2.4 Social Influences

Social influences have also become more apparent in curriculum development. As an example, over the last ten years or so, the property/construction industry has seen an increase in the number of women entering the profession which needs to be addressed in the curriculum. Northumbria University has also experienced a sharp increase in the number of international students from different cultures wishing to study here. It is important that our curriculum and teaching methods address this issue. Many university academics report challenges in teaching international students and this is an issue that I feel needs to be

addressed in our school. Common problems may include language difficulties leading to non-interaction in classes and referencing/plagiarism misunderstandings. This is really a separate topic and is covered in more detail in the text by Biggs (2003).

In terms of models of teaching and learning, there have been many valid theories put forward over the last 80 to 100 years. Without going into too much detail, it is good practice for academics to be familiar with a range of theories of learning and teaching whether they be 'humanist', 'constructivist' or 'consumer orientated'. It is important to select those aspects of the theories which are particularly relevant to our practice in higher education. In this regard and in considering our approach to teaching and learning, we have partially adopted the theory of 'constructive alignment'.

According to Biggs (2003), 'constructive alignment is a design for teaching calculated to encourage deep engagement. In constructing aligned teaching it is first necessary to specify the desired levels of understanding. Stipulating the appropriate verbs of understanding helps to do this. These verbs then become the target activities that students need to perform….. and for the assessment tasks to address, in order to judge if the students have been successful in meeting the objectives'.

These principles of constructive alignment are very much mirrored in the aims and learning outcomes set out in a typical module descriptor and act as a valuable tool for both teacher and student.

3.0 MANAGING A CURRICULUM

Before discussing curriculum management in some detail it would be useful to briefly describe the process of formal module approval at Northumbria University. The module BE0871 Career & Business Development has been running for approximately five years but at it's inception it would have been subject to the following procedures. Firstly, numerous internal reviews will have taken place taking into account the views of the professional body (RICS), staff, students and external assessors. Any amendments to the programme curriculum or individual modules needs to be formally assessed by the school learning and teaching (SLT) sub-committee. A module tutor will have been appointed and given the task of preparing a Module Descriptor/Report for committee approval. This will have been sent in advance of the meeting for members to consider. Any comments or recommendations (usually made with conditions) are discussed at the meeting at which the module tutor should attend.

The key stages in the process could be summarised as follows:

- Consultation
- Agree support
- Write module/course
- Submit for approval
- Approval event
- Prepare teaching programme

Curriculum development needs to be constantly monitored and staff are encouraged to periodically review not only the results of their students and the syllabus but also their methods of teaching and assessment. This can be done informally at regular staff team meetings or more formally as part of the module review process. This would normally take place at the end of each academic year for a 20 credit, year-long module.

For the module review process to work efficiently it is important to receive adequate student feedback. This has traditionally involved the processing of self-evaluation questionnaires completed by students usually on the last day of teaching. These have now been updated and improved by the use of the E-Learning Portal (Blackboard) whereupon students can add (type) their additional comments following mainly tick box questions. This has added more clarity to the students' views on how they have or have

not benefited from their learning experience specifically on this module. However, some academics do have certain criticisms on the value of student feedback questionnaires i.e. they tend to measure charisma, the 'Dr Fox effect', not teaching effectiveness in terms of improved student learning (Biggs, 2003). There is also a commonly held view of apathy by the students in completing questionnaires as the results 'will not benefit themselves, only next years' students'.

In my experience, whilst there are benefits to this procedure, by far the most practical and immediate method of dialogue is via staff/student representative meetings which are held twice in each academic year. At these meetings staff are made aware of the added benefits students are receiving from, for example site visits and guest lectures which are positive feedback. As a team we can also consider any negative feedback on issues such as student workloads and timing of coursework hand-in dates etc. All these considerations can assist the school in planning and delivering an improved curriculum but also helps develop a positive relationship between staff and students.

As far as the ongoing management of the curriculum is concerned we have an experienced subject director providing overall leadership of the staff team and curriculum development. Within the team we have a mix of staff from professional backgrounds and those with a more academic background with much research experience. Indeed, the Dean of the School is keen to encourage more staff to engage in research activity. This is an extremely worthwhile exercise as each member of the teaching team can develop a specialist area of teaching expertise offering valuable knowledge to students especially those carrying out their final year dissertations which is compulsory for students on our undergraduate and masters degree programmes.

New staff, like myself, coming directly from the surveying profession are able to advise on what recent changes are happening in the profession and the workplace enabling knowledge to be transferred to colleagues and to 'filter' through to the syllabus. We are also, as new staff required to study PCAPL which benefits ourselves and the school through the exchange of new ideas and teaching practices.

As mentioned earlier, the curriculum can be influenced or driven by many factors including outside bodies. We recently became aware through discussions with the

RICS that many surveying graduates from universities including Northumbria were lacking basic knowledge of business finance which the RICS wished to see addressed.

As a result we have put a stronger emphasis on this subject and included it specifically (including an assessment) in our module BE0871. Minor changes such as this can prove challenging to staff who cannot simply apply some 'fine-tuning' to the curriculum. It is likely to involve such matters as:

- What level will it be taught at ?
- What are the implication on other areas of study ?
- How will it be delivered/ assessed ?
- What resources are available e.g. staff and facilities ?

There also needs to be consideration of the impact on the individual (student) with some students having no prior knowledge and struggling with the concept, whilst others with prior qualifications in business studies finding the assessment too simple. This is currently a topic of discussion between myself and the module tutor to be considered for the forthcoming academic year. The other part of the assessment on this module comprises the submission of a reflective statement by the student which works well for two reasons. It encourages the student to develop a more analytical or critical approach to their writing technique but also enables them to comment on what they have learnt from our lectures and seminars.

At this stage, very little has been mentioned on the role of the teacher in this process. In short, there can be no curriculum development without adequate teacher development. In the words of Kelly (2005) we need to become 'reflective practitioners', professionals able to evaluate their own work with a view to improving it continuously. This continuous self-evaluation can be assisted by teachers being actively

engaged in research. This point is well considered in the text by Stenhouse (1975) who states that a teachers research and development programme increases his/her understanding of his/her own work and hence bettering their teaching. 'It is not enough that teachers' work should be studied: they need to study it themselves'.

Once a curriculum has been developed it has been noted that it should be subject to continuous evaluation. There has also been the additional concern from various interested parties for higher education institutions to provide 'value for money' especially with the recent introduction of student top-up fees. Much has been written on the subject of curriculum evaluation which Kelly (2005) summarises as follows:

As with assessment, an important distinction is the contrast between 'formative' and 'summative' evaluation. 'Summative' evaluation is concerned primarily to ascertain if the goals of the course have been achieved. 'Formative' evaluation is concerned to provide feedback and thus a base for course improvement, modification and future planning. The latter is one area where, overall, according to the Quality Assurance Agency (QAA), many universities including Northumbria are poor at providing good feedback to students, although this does not appear to have been echoed by students of the School of the Built Environment which is satisfying to know.

4.0 QUALITY ASSURANCE

As mentioned above improving the quality of teaching and learning in universities is currently of concern amongst providers, politicians and stakeholders.

In higher education institutions external quality assurance procedures take the form of audits that are carried out by the Quality Assurance Agency (QAA) with Northumbria having it's last QAA audit approximately two years ago. The QAA provides a 'benchmark' to measure academic quality to assist both students understand the learning opportunities available and also the educational institute's teaching, support and assessment criteria.

These definitions of academic standards and quality standards together with published reviews of these standards are a vital source of information for reviewing and further developing a curriculum. This information can be accessed easily via the QAA website (www.qaa.org).

Biggs (2003) states there are generally two kinds of quality assurance (QA) : *retrospective* QA, which assures quality by requiring conformity to externally imposed standards ; and *prospective* QA which assures quality by continually striving to improve teaching and learning in the institution.

Although quality assurance should include all aspects of teaching and learning it is the quality of the assessment process which gets most scrutiny and which as a new member of staff can be daunting. On this subject, the author Race (2005) recommends various tips including you interrogate your own assessment instruments and processes against the QAA's 'Code of Practice'. This can lead to the discovery of important glitches, and the opportunity to improve assessment practice. There is also the importance of not only keeping data from year to year but using it to identify where students generally showed strengths and weaknesses.

Within our teaching team a number of colleagues are involved in the role of external assessor at other universities. This is an excellent way to learn from the experience of other institutions and to carry out quality-reviewing of yourself. What you learn about the excellence (or otherwise) of others' means of assessment can then be transferred to your own context.

5.0 SUMMARY

In conclusion, I have over the last year, working as a lecturer at Northumbria and studying part-time the PCAPL course, learnt a great deal about the processes involved in developing and managing a curriculum. The formative assessment in TE0704 (PCAPL) whereby we prepared a new module and submitted it to

a 'mock' SLT sub-committee was extremely valuable. It has stressed to me the importance of attention to detail such as student workload hours and the necessity of good teamwork to bring all the various strands together to complete a module descriptor.

I have learnt that a good starting point for the writing of a new module descriptor is the learning outcomes. We also need to concentrate on aligning our teaching methods to the learning outcomes and methods of assessment. Other considerations at the outset may include the following:

- Why is the module needed?
- Will it be core or optional?
- What are the learning pre-requisites?
- Is there a market demand for it?

This will undoubtedly help me in the forthcoming years work preparation.

The development of a curriculum is very much a 'balancing act' whereby students' educational requirements need to be met whilst still considering professional body requirements and the availability of resources. It is clear the curriculum constantly has to adapt and be refined through ongoing evaluation and close scrutiny by internal and external parties. Fortunately, whilst the enormity of the above is daunting, I am constantly able to rely on the support and guidance of the resources, colleagues, admin staff and the Dean of the School of the Built Environment i.e. there is always someone who can help.

In the near future I am likely to take on more responsibility in the role of module tutor for various subjects in which I would possibly like to explore alternative methods of formative and summative assessment. With more experience I would consider a future role as an external assessor at other universities or develop a better network of communication between ourselves and other universities running similar courses to share ideas which may well influence future approaches to curriculum development.

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Assessment for Learning in Architectural Design Programmes

Peter Holgate[1]

ABSTRACT

This paper compares the learning and teaching strategies practised in the programmes of the Architectural Subject Group at the University of Northumbria with best practices of assessment ('Assessment for Learning') as promoted by the Centre for Excellence in Learning in the same University. These best practices are grouped under the umbrella concepts of 'Assessment for Learning' and comprise six key criteria which can be paraphrased as; authenticity and complexity in methods of assessment; use of summative assessment as the main driver for learning; extensive opportunities to develop and demonstrate learning; rich in formal feedback; rich in informal feedback; developing students' abilities to direct their own learning, evaluate their own progress, and support the learning of others.Keywords: architecture, assessment, learning.

Keywords: Assessment in Architecture, teaching and learning, best practice.

1 *Division of Architecture, School of the Built Environment, Northumbria University, Newcastle upon Tyne NE1 8ST.*

E-mail: peter.holgate@northumbria.ac.uk

1.0 INTRODUCTION: TEACHING AND LEARNING IN ARCHITECTURE

'*…architecture is a throwback to an epistemology older than the one around which the modern university was formed.'* (Schön D, 1985).

The writings of Donald Schön remain the seminal analyses of design studio teaching; his concepts of 'reflection in action' and the notion of the teacher as 'coach' remain the basis of much of the ensuing research of design teaching strategies (Webster H, 2001). Schön refers here to the 'bimodality' of the subject, in that architecture cannot be satisfactorily categorised as either science or art. Historically, architecture developed from environments closer in spirit to apprenticeships than to the modern university setting. The '*Ecole des Beaux-Arts*' of C19th Paris sought to embed the 'learning by doing' teaching strategy in an educational establishment; this remains the default model of architectural educational practice to this day; champions of the studio learning environment have however been countered by less favourable commentary;

'Here you have the seeds of our own studio culture; the long hours, the intense competition, the schematic design focus, the absence of users, the relative disregard for how things get built, and the emphasis on the development of prototypical solutions.' (Fisher T, 2004).

Following the precedent of the Beaux-Arts school, the teaching design studio evolved into the central learning environment for the profession. At the University of Northumberland, the provision of studio space and the development of a 'studio culture' have been viewed as key criteria in the success of the Architecture programme. Despite many universities closing down studio spaces – often by reason of the space-rich requirements and the relative expense of the teaching methods – the architecture department of Northumbria continues its provision of studio space in the Architecture programmes for the following reasons;

a) Authenticity of experience: The 'Atelier' remains the predominant typology for architectural offices, often using the '*burolandschaft*' format of an open-plan space facilitating quick transferral of information and ideas between architects, apprentices and technologists. In the higher education studio, the same principle applies to tutors, students and peers. When coupled with authentic problem based learning (in the form of briefs for particular building types on real sites and locations) the studio experience reflects authentic architectural practice.

b) Student Experience: Constant occupation of the studios encourages both educational and social interaction between the students. By combining the three years of the undergraduate programme, valuable experience can be passed on to the newer students. Identity within (and belonging to) the programme cohort is strengthened by the provision of space which can be personalised as the territory of the subject group. This contrasts with the experience of other programmes where student groups may have no fixed base.

c) Collaborative and Group Exercises: The educational studio (in common with professional offices) provides an ideal environment ideal for production of collaborative outputs. The relative generosity of studio space also allows for a variety of activities and events – reviews, displays, fabrication and exhibition – which enrich teaching and learning on the course.

Webster's analysis of educational theory after Schön reinforces studio teaching's allegiance to the principles of Constructivism; "*the notion that meaning could not be imposed … but that knowledge had to be created by the learner through the transformation of personal experience*" (Fisher T 2004, p5). Problem Based Learning, in the form of authentic design studio briefs, provides the opportunities for teaching, learning and reflection essential to the quality and success of studio teaching.

2.0 CONSTRUCTIVE ALIGNMENT WITHIN ARCHITECTURE PROGRAMMES

'Everyone designs who devises courses of action aimed at changing existing situations into preferred ones…Design, so construed, is the core of all professional training…schools of engineering, as well as schools of architecture, business, education, law and medicine are all centrally concerned with the process of design' (Simon H 1996).

Critical to the validity of both the undergraduate and diploma courses is compliance with the learning criteria prescribed by the Architects Registration Board. Broadly, these criteria are grouped under one or more of the following five subject headings; *Design ; Cultural Context ; Technologies and Environment ; Practice and Management ; Communications*. Modules within Northumbria's architecture programmes explicitly incorporate these criteria, with '*Desig*n' – in the form of studio based projects – at the core of the subject's teaching and learning strategies.

The Design modules of both the Architecture and Professional Diploma programmes are heavily weighted in comparison with modules covering with the other four subject headings cited above. The outputs of these design modules – generally in the form of architectural plans, sections, elevations, perspectives, models, diagrams and text describing the students' proposals – provide opportunities for the explicit integration of learning from the other four subject headings. For example, ideas and learning from *Cultural Context* modules can be demonstrated in a design which references historical building precedents; the syllabus of *Technology and Environment* may becomes apparent in the constructional methods employed in Student designs; *Practice and Management* can be evidenced in compliance with building guidance and regulations; Finally, the curriculum of C*ommunications* modules concerns the successful description of the students' intents by means of graphical, electronic, oral and written media.

3.0 ASSESSMENT FOR LEARNING STRATEGIES

'Assessment defines what students regard as important, how they spend their time and how they come to see themselves as students and graduates' (Brown S and Knight P, 1994)

The Centre for Excellence in Teaching and Learning (CETL) at the University of Northumbria promotes best academic practice in the various schools and subject groups of the institution. A key principle of CETL is the widespread promotion and application of 'Assessment for Learning' strategies in teaching delivery. Six conditions have been identified as key to the successful implementation of 'Assessment for Learning' in learning environments;

emphasises authenticity and complexity in the content and methods of assessment rather than reproduction of knowledge and reductive measurement

uses high-stakes summative assessment rigorously but sparingly rather than as the main driver for learning

offers students extensive opportunities to engage in the kinds of tasks that develop and demonstrate their learning, thus building their confidence and capabilities before they are summatively assessed

is rich in feedback derived from formal mechanisms e.g. tutor comments on assignments, student self-review logs

is rich in informal feedback e.g. peer review of draft writing, collaborative project work, which provides students with a continuous flow of feedback on 'how they are doing'

develops students' abilities to direct their own learning, evaluate their own progress and attainments and support the learning of others (UNN_1, no date)

These criteria have been successfully applied to a range of programmes and modules in the various Schools within the University, and have clear applications to many more; some traditionally run lecture based modules may have been knowingly or unwittingly constrained by an adherence to the prescribed delivery methods and student workloads of the University's module descriptor templates.

4.0 AUTHENTICITY AND COMPLEXITY IN PROBLEM BASED LEARNING

'Problem Based Learning reflects the way people learn in real life; they simply get on with solving the problems life puts before them with whatever resources are to hand…Young people are taught the sorts of things they are likely to need to know…before they are let loose on the world' (Biggs J, 2007).

Authenticity and complexity are inherent in the design project briefs issued to the students of architecture, and reflect true professional practice. In this respect, design assignments are delivered to promote 'Problem Based Learning'. An architectural brief is provided for a building with a prescribed programme, and students are set the task of providing a design solution of '*commodity, firmness and delight*.' This reflects authentic architectural practice, not least in the requirement to deliver proposals within a tight programme. However, in the learning environment of the University design studio, more time can be devoted to the *process* by which the design is developed rather than expediting the final outputs.

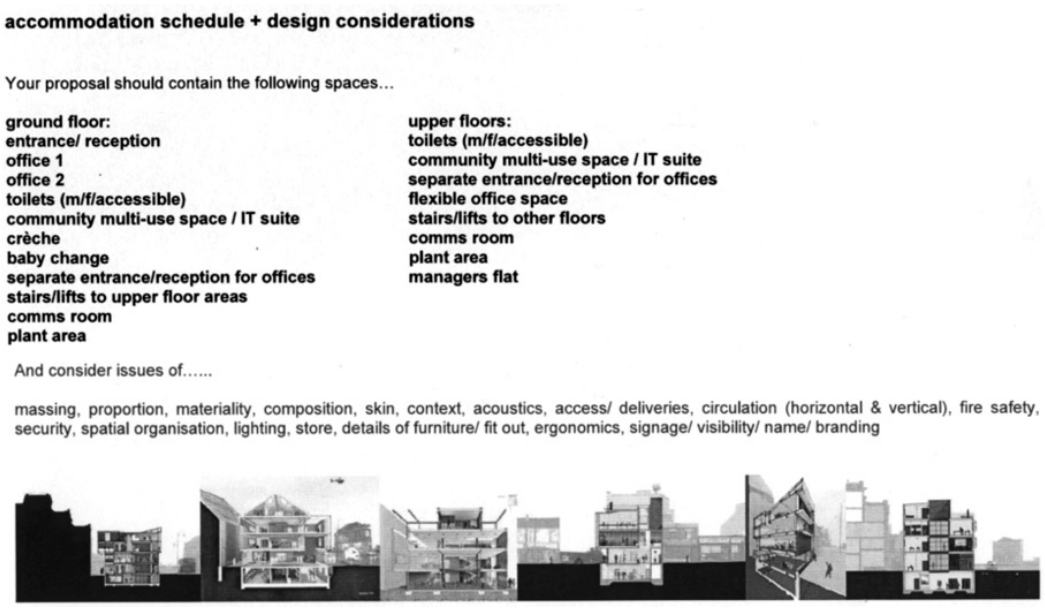


Fig. 1.0 3rd Year 'One Stop Shop' schedule of accommodation (author; Ben Elliott)

This drive to authenticity is supported by tutor-directed and self-directed research, examples being visits to the chosen site and buildings of relevant typologies, presentations and tutorials by architects and consultants experienced in the building type, and discussions with relevant clients and end-users.

5.0 USE OF HIGH RISK SUMMATIVE ASSESSMENT

'If any failing was to be done, it was a privilege reserved to the in-house staff, with no more comprehensible reasons being offered than 'Well….he just can't design, can he?', which overrode any suggestions by us outsiders that the design might fulfil the functional criteria of the brief' (Banham R, 1975)

Summative assessment is used sparingly – at the end of the design process – and the assessment criteria are made explicit to the students throughout the extensive opportunities for formative assessment during the course of the design project. In many Schools of Architecture, the traditional culmination of the project would be marked by the final 'crit'; an open review of the student's proposals before a group of tutors

and peers. This adopted format of 'standing before the jury' often resulted in a negative, intimidating and adversarial atmosphere. At undergraduate level, the University of Northumbria seeks actively to avoid confrontational and negative criticism, particularly where this could be misconstrued as a personal attack; the staff members take great care in the use of language to ensure that any criticism is explicitly concerned with the output, and not with the student. Consideration is being given however to the benefits of the 'crit' scenario in the Professional Diploma programme, where the self-directed student should be familiar with the comparable format of client presentations, and the cultural '*terms of engagement*' of such potentially adversarial situations, after a year's experience in practice.

Reviews within the formative assessment strategy require the students to orally explain their proposals. As part of the summative assessment – a final review - the students are again afforded this opportunity; this benefits any students who otherwise may not adequately describe their proposals simply by means of drawing or other media. A condensed '*narrative*' of the scheme proposals are provided in the final display boards which comprise the synoptic presentation of the design.

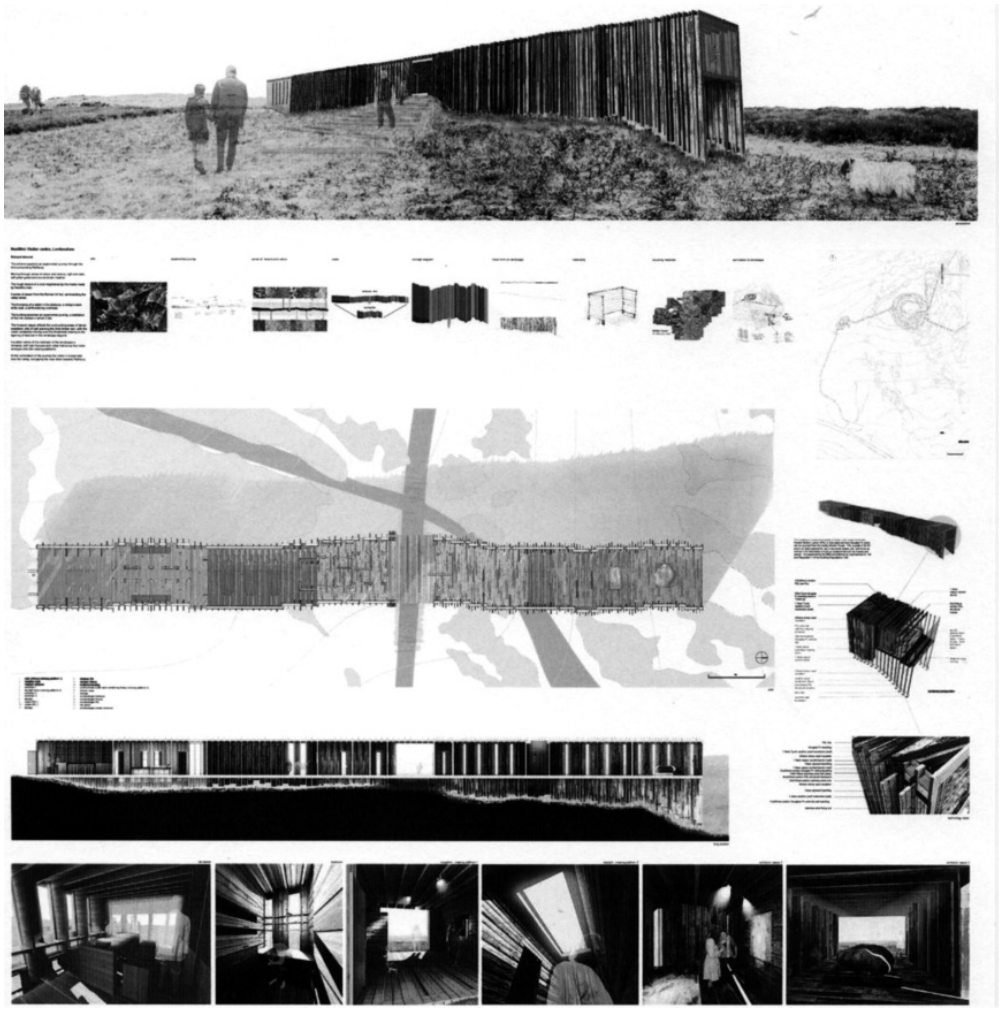


Fig. 2.0 Synoptic Display Presentation (Credit; Richard Almond)

5.1 Summative / Portfolio Assessment

A portfolio is a structured collection comprising evidence and critical reflection on that evidence' (Baume D, 2001).

Summative assessment is based upon the cumulative output of the preceding weeks of formative assessment and feedback. A portfolio submission is required which, together with the final proposals, collects and demonstrates all the iterative developmental work by the student – sketch models, diagrams, initial and scheme designs in a variety of media – thus providing clear evidence of the student's learning journey from the project's inception to completion. The extent and success of the project's (and the student's) development is embedded into the summative marking criteria.

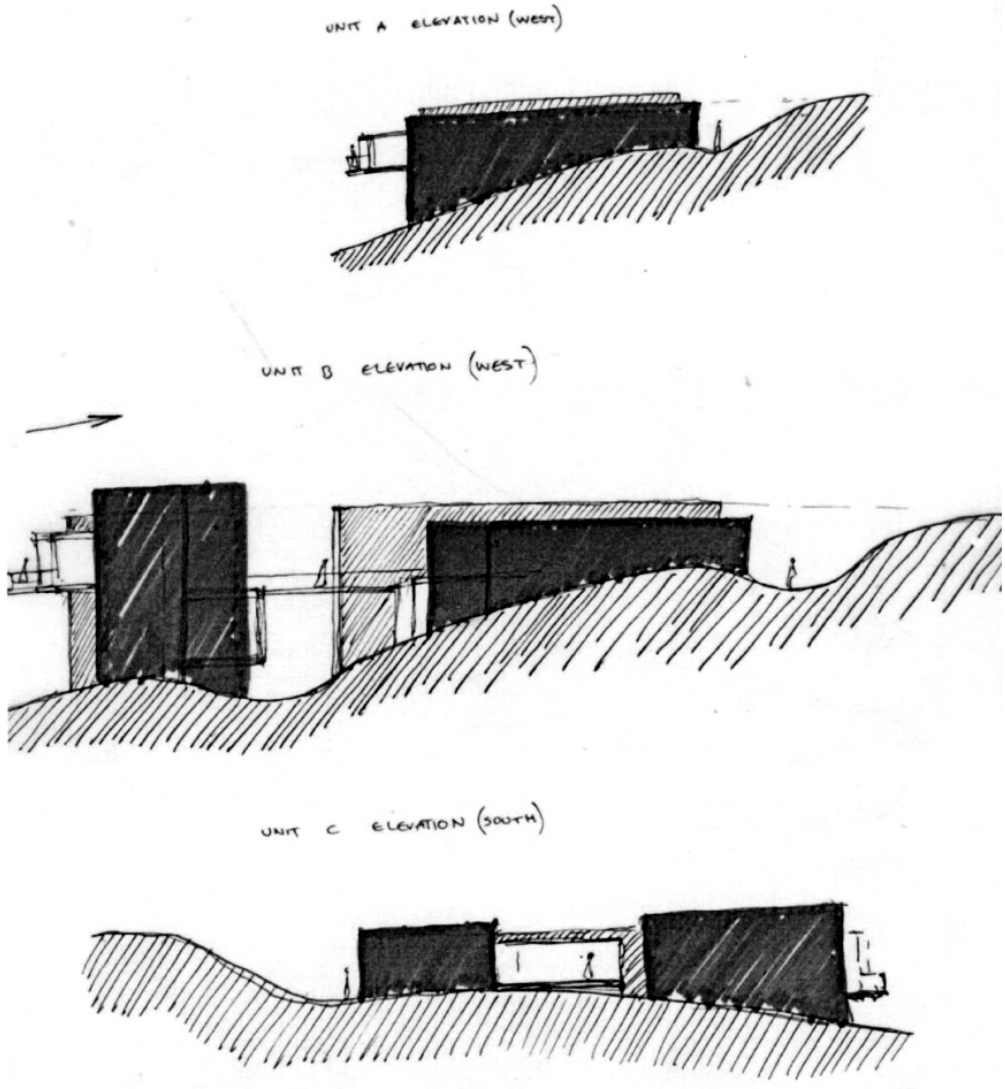


Fig. 3.0 Example of sketchbook development in a portfolio assessment (credit; David Hood)

6.0 OPPORTUNITIES TO DEVELOP AND DEMONSTRATE LEARNING

Students are afforded the opportunities on a weekly basis to develop and demonstrate the skills and learning that will be required to complete the summative assessment. A useful and authentic technique used to evidence the development of the students' learning is a digital presentation of the scheme, which describes the development of the proposals leading up to the tutorial or review at that time.

Fig. 4.0 PowerPoint slide of formative scheme (credit; Lisa Hanking)

Interim reviews are programmed into the curriculum to consolidate the formative assessment protocols; these also provide the opportunity for alternative or guest tutors to provide feedback to the students at key points in the development of the project. The digital presentation (PowerPoint, PDF or similar) provides a structured and current portfolio of the student's proposals; content may include photographs and sketches of the site, materials found *in situ*, initial sketches, diagrams of sun-paths, prevailing wind directions, site conditions, images of architectural precedents, photographs of scale models, as well as the graphic conventions of architectural communications – plans, sections, and elevations. The benefits of these interim presentations are manifold; the individual student is encouraged to consider a *narrative* for the project – structuring the diverse factors and influences at hand by means of 'telling a story', describing the genesis, development and aims of the particular project; hence, 'reflection' is embedded into the teaching and learning process – the student benefiting from 'self-reflection' in analysing their own work; 'reflection in action' also arises through the student's subsequent engagement with the tutors.

This presentation technique is augmented with the student's oral commentary, thereby engaging the tutors in a dialogue of feedback and guidance; the entire exercise provides an authentic experience, replicating

the professional format of architectural presentations in practice, albeit in the gentler, nurturing context of the design studio; the student presentation and the response of the tutors also provides a rehearsal for future formative and summative presentations; group projects allow the individual team members to play to their strengths and extend the collaborative dialogue and interpersonal skills within the team, again, to the practical benefit of students entering the professional realm. Tutors use the interim reviews as an opportunity to formalise the student feedback in written form, providing review sheets which comment on the progress of the individual student with respect to the marking criteria issued at the commencement of the project; interim grades are provided to let the students know specific areas of strengths and weaknesses. From time to time, tutorials and reviews are structured with pairs of students, allowing one student to note the key points of the other's review – this can be used to supplement the staff comments; the recording student also benefits from the potential for application of these comments to aspects of their own personal project.

7.0 FORMAL FEEDBACK PROVISION

'Coaching artistry flourishes in a setting like the architectural studio with its physical arrangements for doing and making things, its patterns of organization, and its cultural traditions. (Schön D, 1985).

Following the introduction the brief, the student is tasked with the production of initial concepts for discussion the following week. This format for teaching and learning commences in the first year of the Architectural Degree programme, and continues through to the final year of study (resuming in the Professional Diploma programme.) By the third year of the undergraduate programme, the students and tutors should be well-versed in these 'rules of engagement' and the methods employed to 'frame' and 'reframe' the design problem (Schön D, 1985). Tutors provide weekly sheets for the students which stipulate the tasks that the students should address in the week ahead, and benchmark the expected level of progress of students within the cohort.

The iterative process of the studio tutorial allows the tutor to monitor the student progress effectively; any misunderstandings in communications or expectations can be attended to at the following session; in the best cases, the student feels comfortable being allowed to 'make mistakes' and learn from these, without the threat of heavy penalty in the summative assessment; weekly contact with the tutors allows for immediate retrieval when problems occur. The formative assessment and learning strategies are therefore inextricably interlinked, the feedback actively influencing the course of action.

Formal feedback, from a variety of tutors and practitioners, is provided at intermediate reviews in written form. The upkeep of a reflective logbook is encouraged, this practice being stipulated as part of the students' portfolio submissions. Studio design projects conclude with a final review which will assign relevant feedback to the project learning outcomes as a final summation of the work which needs to be addressed.

8.0 INFORMAL PROGRESS FEEDBACK

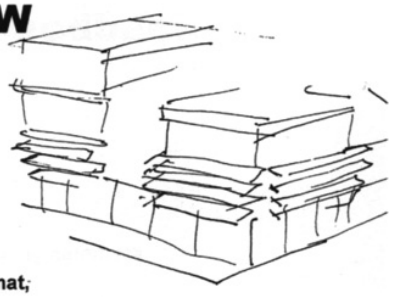
'In the past design tutors have used their professional judgement alone to judge student performance – the 'connoisseur' model…..However, the use of hidden criteria may not be particularly beneficial to student learning.' (Webster H, 2007)

Essentially, Webster (2007) and Sara and Parnell (2004) highlight two factors critical to the success or otherwise of continual formative assessment; Firstly, the ability of tutors to communicate *implicit* assessment criteria *explicitly*. Typical examples of such criteria in Architectural Design may include the use of standard graphic representations (eg. the use of arrows to denote an entrance on plan); care in graphical communications (ensuring plans and elevations are centrally located in drawings, horizontally aligned etc.); clarity of design intent; student ability to communicate a narrative; care and attention (binding

ASSESSMENT YR3 ADM 14/11/2006

One Stop Shop Int. REVIEW

name [redacted]



Learning outcomes

1. **To research and record context and place**
2. **To develop a solution that is contextually derived**
3. **To commit thematic and contextual ideas into model format;**
4. **To explore the nature of internal and external space their interaction**
5. **To investigate primary technology, and materiality.**
6. **To record the process in sketchbook and A3 workbook**

1	2	3	4	5	6
D+	C+	B−	C+	C	C− (?)

GENERAL COMMENTS

CONSIDERING AWNINGS: PLACEMENT OF FOREIGN OFFICE:
IDEA OF DRAWING PEOPLE IN.
GOOD ORGANISATIONAL DIAGRAMS: SOME CLEAR GRID ORGANISATION
TRANSPARENCY OF GROUND FLOORS:
BALANCE FOR NOISIEST ACTIVITIES → DIAGRAM NOISE → QUIET AND SECTION
NEEDS TO BE SET WITHIN THE LOCAL CONTEXT – PRESENT IMAGES
OF LOCAL MATERIALS AND FORMS TO INDICATE PRECEDENTS.
SET FLOOR LEVELS, BUILDING HEIGHTS ETC. TO RESPECT NEIGHBOURING
FABRIC.
LOOK HARD AT TECHNOLOGY TO MAKE THIS EFFECTIVE, PARTICULARLY
GROUND FLOOR SECURITY ISSUES.
SOME GOOD ENVIRONMENTAL WORK – MUST BE DEVELOPED – SPEAK WITH
PB

Fig. 5.0 Anonymised Review Sheet

drawings together chronologically to show the development of a scheme.) The requirement for clarity is now entrenched in the guidance of the Quality Assurance Agency, which states that assessors must make their assessment criteria and practices explicit. In design, this requires that the writing of learning outcomes must accurately reflect the tutors' true criteria.

Secondly, the authors highlight a requirement for tutorial care in the use of language; *"'Since the tutors, visiting critics and even students are already (to a greater or lesser degree) inculcated into the profession, the review can be seen to sanction the consumption of 'hegemonic knowledge'"* (Sara R and Parnell R, 2004). Architecture, as with many other subjects, has established a jargon of acronyms, similes, and figures of speech which are familiar to the practitioner, but may be unfamiliar to newcomers to the subject area. The tutor must be aware of the unfamiliarity of such language to new students, and endeavour to either explain the principles clearly, or communicate without reliance on specialist terminology. In either case, this will benefit the student, not least in future dealings in the professional arena.

8.1 Emotive Aspects of Assessment

'Teachers should be aware of the impact that comments, marks and grades can have on learners' confidence and enthusiasm and should be as constructive as possible in the feedback that they give. Comments that focus on the work rather than the person are more constructive for both learning and motivation…… the experience of being assessed is interpreted as both positive and negative in its impact. In some cases the interaction between the learner and the assessment event is so negative that it has an emotional impact that lasts many years… Assessment appeared to be intimately connected to identity. Experiences were taken personally' (Boud D and Falchikov N, 2007).

It is a truism that in Architecture there is always another drawing to be done; the more details, sections and images that are produced, the more complete and thorough a scheme will appear. The emotional wellbeing of the student in review or tutorial situations is often compromised by the dynamics of this process of 'learning by doing'; in the desire to achieve some degree of 'perfection' in design the student will often forego socialising, relaxation, and especially sleep (Sara R and Parnell R, 2004). When coupled with the potential for an adversarial debate in lieu of constructive dialogue, this imbalance can lead the student to assume a defensive position, thus limiting the actual learning taking place. The staff members of the Architectural programmes of Northumbria University are aware of the potential for tutorial criticism to be misconstrued as personal criticism, and staff members use a mixture of strategies - in particular by the use of language – to separate the student outputs from the students themselves. In order to establish a semblance of work/life balance, students are also encouraged to use the studio as a work base; this is underpinned by presentations and informal advice from the staff members with regards to effective time management.

9.0 PROVISION FOR SELF DIRECTED AND PEER LEARNING

'While it may be argued that many activities, such as the many forms of group and teamwork found in higher education today, have the power to encourage co-operation, two stand out as particularly beneficial and influential: peer tutoring and student involvement in assessment' (Boud D and Falchikov N, 2007).

The teaching of Architecture has tremendous potential for the inclusion of peer assessment. Peer tutoring is seen as *'particularly relevant when one seeks to maximise the student's responsibility for his own learning'* (Boud D and Falchikov N, 2007). The extensive formative feedback provided through a design project allows students to direct their own learning; reviews, tutorials and studio attendance and practice allows students rich opportunities for peer learning and self-assessment

However, in peer reviews there is the potential for excessively negative or positive criticism, and uninformed or partisan opinion, which can arise without the moderating presence of the tutor. Informal peer assessment – and peer assistance – is however encouraged by the development of a studio culture.

Cohorts are grouped together, allowing the possibility for comparison of progress and the provision of support mechanisms of the peer groups and individuals. Formal peer assessment has now been introduced into first year studio reviews, with the intention to review the potential benefits and apply these to the upper year groups.

9.1 The Learning Environment of the Design Studio

The Design Studio serves many functions in the teaching of architecture; it forms an authentic mirror of a professional design atelier; it provides a location specifically dedicated to the cohort, and thus strengthens the identity of the group. With respect to student retention this is an invaluable asset in coupling a learning environment with a social space, a community facility which can be personalised by the students over the course of an academic year. Thirdly, the design studio provides an automatic learning environment for peer and self directed learning.

Fig. 6.0 First year structures group project in the Design Studio (PhotoCredit: Lewis Preston)

The individual student is exposed to the skills, concepts and abilities of his or her peers; an automatic self –audit of such factors can be attained. Dialogue between students working for similar purposes and goals can be instigated by means of proximity and opportunity. Finally, as aforementioned, structured use of the studio can provide a key component in the enhancement of the student experience by clearly separating 'work' from 'leisure', again reflecting authentic work experience.

10.0 SELF-EVALUATION OF PROGRESS

The learning environment of the design studio provides a constant source of current information for student self-evaluation. The progress of peers is evidenced on the display walls and drawing boards of the studio – as aforementioned, allowing a student to identify any shortfalls and learn from peers. This self-evaluation is reinforced by the staff provision of weekly progress sheets to students of the lower years which clarifies the output expectations of the week ahead. This sheet also provides a checklist of what the student should have achieved to date;

Fig. 6.0 Weekly progress sheet for 1st Year design project (Credit; Paul Ring)

11.0 CONCLUSIONS: LIMITATIONS AND CHALLENGES

'I have become convinced that universities are not devoted to the production and distribution of fundamental knowledge in general. They are institutions committed, for the most part, to a particular epistemology, a view of knowledge that fosters selective inattention to practical competence and professional artistry' -The Reflective Practitioner: How Professionals Think in Action (Schön D, 1983)

Module marks in recent years have supported the thesis that the richness of formative assessment in studio teaching benefits the student enormously. The interlinked teaching and assessment strategies employed in the architectural design studio practice of Northumbria University embed most, if not all, of the six key conditions identified as supporting 'Assessment for Learning' (McDowell et al, 2006). However, there are clearly limitations and challenges inherent in applying these conditions successfully;

11.1 Staff Resources

'How can assessors write assessment criteria that are clear and explicit for both students and assessors when assessment tasks are complex and multi-faceted?' (Dunn L M, et all, 2005)

The quality of teaching provision is currently maintained by intensive staff to student ratios (effectively one to one teaching at Level 6.) However, with increased student numbers and financial pressures for increased efficiencies, consideration must be made of maintaining the quality of the teaching and learning strategies while remaining a profitable programme. The relatively small size of the teaching team allows for flexibility and good communications between the staff members, and the rapid identification and

solution of potential problems. If and when staff numbers increase, greater management skills will be required to maintain consistent standards in assessment and teaching from all staff members.

Roberts recommends tutors determine the explicit description of the expected quality of student performance at top, bottom and middle achievement levels (Roberts A, 2006). This approach demands considerable preparation on the part of the tutor, and is reliant upon consistency of approaches and values among the teaching staff. At the same time, assessment criteria which are overly prescriptive may well inhibit the creativity at the core of the subject. Student outputs must also deal with this dilemma, and there are no easy solutions to hand. Each year, the teaching staff members deliberate extensively on how to achieve a 'best fit' and extensive moderation is undertaken to ensure parity of assessment between students.

architecture + interior design year 1

borneo tutorials Friday 28 / 03 / 2008

site / research / narrative / accomodation diagrams / spatial investigations / 1:100 models / sketchbook development

	Kelly MacKinnon	Peter Beacock	Stephen Roberts	Paul Ring	Ceri Green	Lewis Preston	Tony Watson
09:30	Jake Boardman	Niaomi R Howells	Ray C Paulson	*Charlotte Lundstrom*	*Megan Andrews*	*Khway Yang (Michelle)*	*Flora D'Anyers Williams*
	Tom C Bowey	Chris J Howson	Lisa M Robinson	*Chris Marsden*	*Susannah Cooke*	*James Seabridge-Cooper*	*Ryan Mullholland*
	Chris Brown	Harinder Kaur	Bethany Roebuck	*Lee Whitfield*	*Laura Monaghan*	*Dan Seymour*	Sophie Shields
	Silkie K Chan	*Alvin Cheung*	*Kathryn Mason*	*Helena Gill*		Mark P Rostron	
10:30	Seb Cunningham	Jason Kemp	Lisa Rogan	Gaby Andersson	Robert McCartney	Aman Saundh	Leanne S Stamp
	Adam J Dalby	Carl A Ling	Emily Scullion	Guang Y Bao (Elaine)	Tom McKendrick	Niall V McDermott	David Stones
	Jon A Dennis	Daniel Leover	Jonny G Simpson	Constantinos Kounnis	Lucy Milbourne	Jake McDonald	Jamie S Speck
	Hannah Douglas	James McCarthy	Johnathan Spain	Andy Lee		Sean Hall	
11:30	Steven J Duquemin	Gina J Parisella	Rowan Yassin	Darren P Hancock	Jamie Nicholson	Nikki B Hoggarth	Amy Williams
	Stevie P Hood	Vicky E McQueen	Olivia St-Amour	Chloe Ophelia Gorbulew	Gavin Nixon	Adam J Eckworth	Rob Woodhouse
	Solila Tran	Tom Twist	Angela Crosby	Kelly Morris	Roisin O'Conner	James Finncane	Philip Wright
	Judith Forester	Carl Harper	Kabiee Hlalo	Guy Moulson		Hannah Fletcher	
		L	U	N	C	H	
13:30	*Inger Burud*	*Lin Wang*	*Kirsty Nichols*	Stephany Christodaulou		*Josh Stone*	
	Sarah Boyle	*Fiona Forster*	*Jessica Pan*	*Silke Maret*		*Sarah-Jane Stinson*	
	Sara-Jane Bacon	*Rexanne Gascoyne*	*Lauren Kate Spellman*	*Dean Lamb*		*Adele Paterson*	
	Elizabeth Traill	*Lucy Fining*	*Georgina Williams-Hodgson*	*Charlotte Hubbard*		*Alex Proctor*	
	Harry Biddle			*Richard Haigh*			

Interior Design at CEST 11:00 - 13:00

Fig. 7.0 Tutorial Schedule for combined Architecture and Interiors Design Project (credit; Paul Ring)

11.2 Space Resources

Adequate studio provision is key to the success of the teaching and assessment strategies, and the full potential of peer learning and assessment should be exploited within this invaluable learning arena. However, the quantity of space afforded to studios is extensive (and expensive); many schools of Architecture in the UK have been forced to closed down studio spaces, breaking the spatial link between the production and critique of student work. Fortunately, the School of the Built Environment at Northumbria has been consistently supportive of studio based teaching as part of its variety of teaching and assessment strategies.

11.3 Entry Level

*'**Spiralling**' describes the process by which the learner constantly returns to 'previous' learning and understandings in the light of new learning and new experience. Just as this new learning and experience compel us to reconsider and reconfigure previously held concepts and understandings, so those previously-held concepts and understandings help us to make sense of new experiences and conceptualisations as they occur"* (Moore A, 2000).

Jerome Bruner's concept of 'spiralling' echoes the path of the student's learning experience through architectural education; the key concepts of 'shelter', 'enclosure', 'place' etc. will be common to all projects throughout the programme. However, the student will constantly return to such concepts with new understandings or knowledge which re-frame the student's approach to a particular design. Experience suggests that the Assessment for Learning methods embedded in studio teaching are a step change from the teaching and learning strategies of the high school environment. Students who have historically achieved much higher grades at A-Level are consistently surprised by receipt of much lower grades for assignments in the undergraduate programme. The cultures of returning to 'previous learning' or of making mistakes – and learning from these – are foreign to many of the students who have been conspicuously successful in the secondary education environment of rote learning and summative examinations. Staff members of the Architecture group are charged therefore with the successful management of expectations of the students, while they learn to cope with new learning strategies; *Learners should become as aware of the 'how' of their learning as they are of the 'what'* (QCA, no date).

11.4 Studio Culture

'learning communities with a collaborative pedagogy can help 'validate' a student's presence on campus and encourage persistence and retention' (Tinto, 2007).

Tinto's statement has a particular resonance with first year students with regards to transition, identity and retention (SSD, 2005). This is reinforced in the findings of a recent working paper commissioned by the Centre for Education in the Built Environment;

'The studio seems to be particularly important for first year students in forging a sense of belonging and identity, less so for upper year students where the focus seems to shift towards greater mobility, with identity being achieved through continuous connectivity and regular events.' (Duggan F, 2004)

Peer learning in particular is embedded within the best practice of studio culture, and may prove to be a key tool in teaching, learning and assessment strategies which will deal with the increasing student population of the architectural programmes.

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A Critical Appraisal and Development of Assessment Strategy

Jess Tindall[1]

ABSTRACT

Factors effecting student motivation are important and must be considered if the performance of future student cohorts is to be improved. Theories regarding the interaction of 'expectancy and value' have been set out. Because the relationship is multiplicative it is necessary to ensure that both 'expectancy and value' are present within the psyche of each and every student for each and every task assigned. This work critically appraises the delivery of a level 5 module over two successive academic years and demonstrates the application of 'expectancy-value' theory in module improvement. A formative course work was modified to align the outcomes with the summative coursework which resulted in significantly improved student motivation due to the addition of previously lacking 'value'. Ideas are presented for the final summative coursework which could also bring significant benefits. However, these have not yet been adopted due to the real difficulties associated with group working. Both 'value' and 'expectancy' were initially lacking from different course works and were resulting in reduced student motivation.

Keywords: formative, feedback, value, expectancy, authentic assessment

1 *Division of Sustainable Buildings and Energy Systems, School of the Built Environment, Northumbria University, Newcastle upon Tyne NE1 8ST, UK*

E-mail: jess.tindall@northumbria.ac.uk

1.0 INTRODUCTION

Effective formative and summative feedback can be provided in many ways. It is also important for building student confidence and might be regarded as a key tool for improving the future academic performance of students. Irons (2005) quoting the work of Clarke et al (2004) confirms that formative feedback can act to "cement students understanding of key concepts and ideas".

The aim of this paper is to critically appraise the assessment stratergies employed during the 2005/06 academic year.

The module BE0750: Building Analysis and System Design Project is chosen, This is a level five, year long module on the BEng (Hons) in Building Services Engineering programme. The module has been selected as the focus of this paper because the range of prior design experience of the students is pronounced and presents some interesting challenges. The assessment for this module is as far as possible 'authentic' as discussed by Dunn et al 2004. In other words the assessment is designed to simulate the design process as it would be encountered in an engineering consultancy practice. It is this authenticity which creates difficulties in effectively assessing the performance of those students with previous design experience.

The expectancy-value theory of motivation as put forward by Biggs (2003) is explored and related to the experience gained on this module.

2.0 FORMATIVE ASSESSMENT

Many opportunities exist for providing verbal formative feedback. "Formative assessment is generally offered in laboratory, seminar and tutorial situations where group size allows consideration and discussion of the subject matter." Northumbria University (2005) Building Services Engineering accreditation document (p.7)

Verbal formative feedback is provided weekly in BE0750 during the IT workshop sessions. Here the teaching staff endeavour to spend some time with each student in order to assess their progress, discuss any problems and provide verbal feed back. This strategy has been adopted over the years in order to encourage students and to help them to develop their knowledge and understanding by clarifying what they need to do or investigate. This strategy is described positively by Irons (2005) drawing from the work of Burke (2003).

2.1 Formal formative assessment

There was one piece of formal formative assessment during week four. The object of the exercise was to ensure (and monitor) that all the students had engaged effectively with the directed learning set for them. The aim was to develop competence with a new building thermal modelling software package. This assessment required the production of a short word processed document. This was to contain the output results from a number of modifications to the building model. Students had been issued with full written instructions detailing how the model should be set up. The engagement with this formative assessment was poor in 2005/06, particularly with the part time students. Irons (2005) drawing from the work of Yorke (2003) suggests that there is evidence that summative assessment tends to dominate student behaviour due to the conflicting demands which many students now face.

During an informal feedback discussion with a group of mainly mature part time students it became clear that they saw little value in this formative assessment as they were relatively confident in their ability to 'muddle through' until they achieved software output results which they judged to be appropriate on the basis of their experience. Biggs (2003 p58) discusses the "common-sense… expectancy-value theory of motivation" which he explains are two factors that work by multiplication. Observations from this module confirm this multiplication theory since the very students who were most experienced, had the best prior understanding, and thus would be expected to have the highest 'expectancy' levels within the group were the very individuals who were not motivated to engage with the exercise because they saw little or no 'value'.

2.2 Summative: added 'value'?

A possible solution to this problem was to make the assessment summative thus assigning some 'value' to this task in the students mind. This solution was rejected due to the belief that all of the marks awarded for the module should reflect how well the student has achieved the learning outcomes and not be allocated based upon how well they have learnt how to use a piece of software.

2.3 Value added through alignment

Value was added to this assessment for the 2006/07 year by changing the assessment task in order to align it with the module learning outcomes. The students were asked to choose one of the twelve tasks from the first piece of summative assessment and apply it to the simple familiarisation model, obtain results from the software, then analyse and present the results and findings in the same way that they intend to do later for the summative assessment.

Written formative feedback was provided in 2006/07 in the place of the *easy to forget and difficult to review* verbal feed back which had previously been employed for this task. It was hoped that the students would see the inherent 'value' of engaging with the formative assessment task since they knew they would receive written feedback which would provide guidance regarding how to improve the analysis and presentation of information for the forthcoming summative assessment.

With the alignment corrected the students were able to see an inherent 'value' (Biggs 2003) and therefore engaged with the formative assessment almost without exception. Also the written feedback given was more beneficial to the student since it related to the analysis and interpretation of the results rather than concentrating on the student's mastery of the software.

3.0 SUMMATIVE ASSESSMENT SEMESTER 1

The summative assessment for semester one (2005/06) required the students to carry out twelve modifications to a substantial building model, using the software package introduced earlier in the semester. The students were then asked to analyse the results utilising the declarative knowledge gained both through the lectures, associated reading and other level 5 modules. The analysed results were then to be presented clearly using annotated graphs, diagrams and text to demonstrate their understanding. The aim being to turn their declarative knowledge into functioning knowledge by applying it to an aligned simulated real life task, i.e. by asking the students to do something that they would be expected to do independently within their jobs after graduation i.e. "authentic assessment" (Dunn et al 2004).

In 2005/06 the quality of submissions was disappointing with little analysis evident either in the text or graphical output provided. As the submission date approached it became clear that students were not analysing and writing up their findings as they went along. Instead they preferred to complete all the modelling tasks. The quality of analysis and writing up suffered by being rushed in the last week or two.

This lack of student focus upon analysis was one of the key drivers for the changes to the formative assignment as discussed earlier. In 2006/07 the summative assessment coursework specification remained essentially unchanged but the student performance was much stronger, as hoped. This was largely due to the benefit obtained from the revised formative assessment.

4.0 SUMMATIVE ASSESSMENT SEMESTER 2

The second semester summative assessment (System Design Project) requires each student to work individually in producing a detailed design for the mechanical services (heating and ventilation plant) for the same building for which they assessed the thermal performance during the first semester, another example of 'authentic assessment' (Dunn et al 2004). Whilst 'authentic assessment' of this sort is desirable and beneficial it can present some difficult challenges where there is a wide diversity in the level of prior experience among the student cohort.

4.1 Diversity issues

There is a shortage of engineers in this specialist field of engineering both in the UK and internationally. This provides a strong driver for Building Services Engineering consultancies to sponsor their employees to study on a part time basis whilst working. Many of these part time students have years of experience working in the construction industry and so study this module with significant prior design experience. Approximately half of the part time students work as electrical engineers and so are not experienced in mechanical system design. Others are relatively new to system design. The percentage of students in the cohort experienced in mechanical design is typically in the region of 10% to 15%. The course also recruits a significant number of full time direct entry students at level five who have studied similar or related courses at Northumbria University or other educational establishments both in the UK, and around the world. As a result of these factors the student cohort is very diverse with regard to their design experience and this presents challenges particularly with the second summative coursework. Put simply the challenge is that this assessment is relatively straight forward for those students with prior design experience and significantly more demanding for those without it.

The coursework specification was prescriptive regarding the engineering solutions that the students were to employ. This was intentional because this module is the very first time that most of the students attempt a full and detailed mechanical system design. It is considered essential that all students gain experience in the fundamental aspects of mechanical services design.

Some flexibility was offered to those students with experience. They were encouraged to propose some alternative design solutions. It was hoped that this would add interest for students. In practice this option was initially received positively by students. There was no evidence of this option having been taken up when the design files were marked. This is unsurprising as it is unlikely a student would compromise a potentially very high mark by expending time and effort on an unfamiliar system design option.

4.2 The sharing of ideas/information

A discussion forum was established on the elearning portal in 2006/07 in order to open up dialogue between the students and to give increased access to advice and support from staff. The intention was to try to close the experience gap by increasing the level of support for the less experienced students and to encourage experienced students to share their experience with others in the cohort where appropriate.

Use of the discussion forum was encouraging during the first semester, with some very effective exchanges. The level of use was however disappointing during the second semester for the System Design Project. In practice there was reluctance amongst the students to post questions. Instead they preferred to wait until the next IT workshop and discuss the issue face to face. A way to encourage the posting of questions could be to prioritise the staff time during the IT workshops to answering questions posted on the forum.

4.3 Expectancy

The 'expectancy value theory of motivation' put forward by Biggs (2003) has already been discussed in relation to the 'value' seen in the formative coursework. There do not seem to by any problems with students not seeing the 'value' of the second semester coursework. This is partly due to the significant percentage of the module marks allocated to this coursework and also the students desire to perform well during the final year project.

The level of 'expectancy' in the students own ability to perform well, however, is often not high. This is particularly true amongst inexperienced students and especially if they feel isolated from the other students in the cohort. This is a major issue which adversely effects the motivation, enjoyment and success of some students. It had been hoped that the discussion forum would improve expectancy in the cohort. Poor engagement with the forum in the second semester reduced its impact. As a result it did not appear to significantly reduce the number of struggling students.

4.4 Group work

Consideration has been given to making the Design Project a group work in order to deliberately mix up those students with and without prior design experience into teams that could then tackle more complex issues and designs in order to better develop the design and team working abilities of the individual team members. If successful this approach would have a number of benefits:

- Group working should help to build camaraderie within the student group and reduce the feeling of isolation which can occur when working on an individual design project. With the help and support of the other group members as well as the module staff the level of student 'expectancy' should improve significantly. With both 'value' and 'expectancy' in place the level of student motivation and enjoyment should hopefully improve.
- Those students without experience would be able to learn from their more experienced peers thus opening up an additional stream of information and ideas in addition to that currently delivered by the teaching staff. The inexperienced designers should be able to offer other skills to the group (IT, mathematics, drawing etc...) and therefore feel like valued team members who are making a valid contribution to the group effort.
- By negotiation with a tutor, regarding the systems to be employed and the problems tackled, it should be possible to ensure that the assessment is suitably demanding for each and every student within the team – something which is not currently achieved. (A similar approach is adopted in the final year design project where each student agrees with their tutor the scope of their project.) In this working environment it would also be easier to encourage innovation and imagination – both of which are expected at level six without offering opportunity for students to develop these skills at an earlier level.
- The introduction of group/team work into level five of the programme should improve management, team working and communication skills. This is some thing which the last Accreditation Panel suggested that the Programme Team should consider introducing at level five.

Whilst group working can offer many benefits there are also many problems which need to be considered. For example care would need to be taken to ensure that the basic design principles which are relatively easy to convey and understand on a simple project were not lost in the increased complexity of a larger project. Assessing group work is also highly problematic and it is rare when dissatisfaction with the awarded marks allocated is completely avoided. Marks allocation is particularly problematic if some members of the team have not pulled their weight which then can breed resentment among the other group members.

The Programme Team were also wary about implementing this idea due to concerns that some students could hide within the groups and therefore progress straight through to the individual and more demanding level six design project without having truly experienced the design process.

In addition previous experience had shown that group projects tend to result in separation of the tasks and each task being given to the member with the most confidence (prior experience) in tackling that particular task, e.g. one member doing all of the ductwork design, another all of the pipework design, another doing all the psychrometric calculations etc. This would be detrimental to the aim of the module, being that each student gains experience of the entire design exercise. It may be possible to overcome this problem by regular careful monitoring by the teaching staff to guide the areas of work done by each student. In practice this would be far too time consuming and detract from the business of providing feedback and guidance.

These issues are not easy to resolve, however, they are worthy of consideration because the benefits which could be reaped are significant.

5.0 CONCLUSION

Through reflection of the experience gained during the 2005/06 delivery of BE0750 and reading the work of Biggs (2003) it has become clear that students must have an 'expectancy' that they can successfully complete an assessment task and also see the intrinsic 'value' of engaging in the task in order to become motivated to participate. Either one of these factors in isolation does not result in a motivated student. Biggs (2003) suggests that the relationship between 'expectancy and value' is one of multiplication and this seems to be supported by the experience gained on this module.

Re-examining the concept of the formative coursework and incorporating ways to add 'value' in the student's eyes by effective alignment with the later summative assessment has been demonstrated to be a successful alternative to forcing student engagement with activities by making them summative. By aligning the formative and summative tasks more closely and providing quality written feedback it has been possible to both improve engagement with formative task and also enhance the quality of the subsequent summative work.

The introduction of group work into the level 5 System Design Project is fraught with potential problems associated with assessment and student performance. If these difficulties could be overcome so that group project work could be successfully implemented group project work could bring great rewards, primarily due to the anticipated enhancement of student 'expectancy' and therefore improve student enjoyment and motivation levels. Ways to encourage the use of discussion forums and/or blogs will continue to be sought in order to improve student 'expectancy' whilst these issues around group working are being resolved.

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Addendum

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